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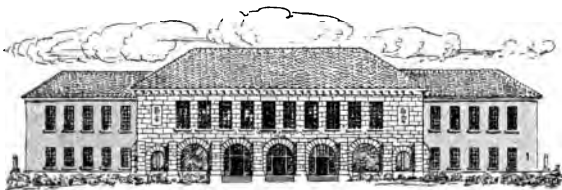
Graded exercises in arithmetic /

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GRADED EXERCISES  
IN ARITHMETIC  
FIFTH YEAR - SECOND HALF  
JURY - O'CONNELL - SHALLOW



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**GRADED**  
**EXERCISES IN ARITHMETIC**

**FIFTH YEAR—SECOND HALF**

**BY**

**MARIA JURY**

**ASSISTANT TO PRINCIPAL, PUBLIC SCHOOL 10, BOYS, MANHATTAN**

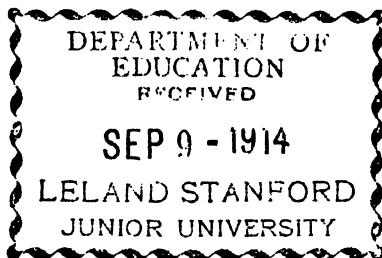
**JEROME A. O'CONNELL**

**MEMBER BOARD OF EXAMINERS, DEPARTMENT  
OF EDUCATION, NEW YORK CITY**

**AND**

**EDWARD B. SHALLOW**

**ASSOCIATE SUPERINTENDENT OF SCHOOLS, NEW YORK CITY.**



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JURY GR. EX. ARITH. FIFTH YEAR—SECOND HALF.

629249<sup>W. P. I</sup>

C

## PREFACE

THIS book has been prepared for the purpose of simplifying the study of arithmetic and of fixing its facts in the memory.

It includes work for the second half of the fifth year, divided into five main parts, corresponding to the months of the usual school term. Each of these parts is again divided into twenty groups of problems, corresponding to the usual number of school days in a month. One half of the oral and the written work in each group of problems will require for completion the attention of an average class for about thirty-five or forty minutes.

Each month's work is preceded by an outline of the topics to be studied, in which the new work is distinguished from the rest by being printed in full-faced type.

Provision is made for frequent reviews, including rapid calculations in the fundamental processes and examples in the most important parts of the arithmetic previously studied. By this means a proper perspective of the subject is maintained.

While most of the material has been selected for pupils of average ability, additional problems are given for pupils of advanced standing. These problems can be used also for variety, when pupils are required to go over the grade work a second time.

The language used is simple, clear, and precise. The study of mathematical relations should not be complicated by difficulties of language, nor by distractions introduced through the content of the problems. The problems here given are within the experiences of the children, and are true to conditions of everyday life.

The problems present a gradual increase in difficulty—an arrangement that conduces to steady progress and ease of comprehension. The topics are treated in the order suggested by the most approved courses of study.

THE AUTHORS.

## THIS BOOK CONTAINS

### RAPID DRILLS

### READING AND WRITING LARGER NUMBERS

### ROMAN NUMBERS

### FUNDAMENTAL OPERATIONS

Addition

Subtraction

Multiplication

Division

### COMMON FRACTIONS

Reduction

Mixed Numbers

Greatest Common Divisor

Least Common Multiple

Addition

Subtraction

Cancellation

Multiplication

Division

Compound Fractions

Complex Fractions

### DECIMAL FRACTIONS

Reduction

Addition

Subtraction

Multiplication

Division

BILLS (using terms *Debtor* and  
*Creditor*)

MEASUREMENTS AND COMPARI-  
SONS

AREAS OF PARALLELOGRAMS  
AND OF TRIANGLES

DENOMINATE NUMBERS (using  
two or three denominations)

### PROBLEMS

Finding a part of a number

Finding a number when a frac-  
tional part of it is given

Finding what part one number  
is of another

Finding a number when the  
number plus or minus a frac-  
tional part of it is given

### PERCENTAGE

Finding per cents of numbers

Finding what per cent one  
number is of another



# FIFTH YEAR—SECOND HALF

## FIRST MONTH

**RAPID DRILLS**—daily.

**READING AND WRITING NUMBERS**—continued.

**THE FUNDAMENTAL OPERATIONS**—to secure quickness and accuracy.

**COMMON FRACTIONS**—reviewed. **Compound Fractions.**

**DECIMAL FRACTIONS.** Reduction, addition and subtraction of more than three units.

**DENOMINATE NUMBERS.** Reduction.

**MEASUREMENTS.** Linear measure, square measure, cubic measure.

**TABLES.** United States money, English money, **value of franc, value of mark**, dry measure, liquid measure, miscellaneous, **score** and dozen, **gross and great gross**, quire and ream.

**BILLS**—reviewed, using terms debtor and creditor.

**PROBLEMS.** To cover the work of the month in common and decimal fractions and tables; also three of the type problems.

### I

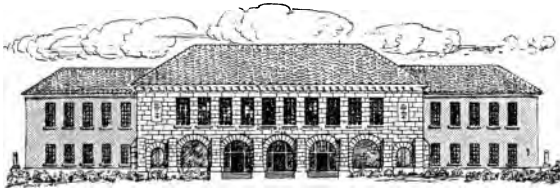
**Oral.**

**Rapidly add:**

45	45	48	48	27	27	27	38	38	56	56	56	56	45	48
<u>17</u>	<u>27</u>	<u>23</u>	<u>33</u>	<u>18</u>	<u>19</u>	<u>24</u>	<u>25</u>	<u>35</u>	<u>18</u>	<u>19</u>	<u>28</u>	<u>29</u>	<u>28</u>	<u>27</u>

$9 \times 7 = ?$ ;  $8 \times ? = 72$ ;  $? \times 7 = 42$ ;  $7 \times 8 = ?$ ;  $4 \times 12 = ?$

Read: 30019; 63200; 8421205; 100.023; .123; 123; .5; .05; .005; .0005; .00005; 17244321; 381426; 85.0175.



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# GRADED

## EXERCISES IN ARITHMETIC

FIFTH YEAR—SECOND HALF

BY

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ASSISTANT TO PRINCIPAL, PUBLIC SCHOOL 10, BOYS, MANHATTAN

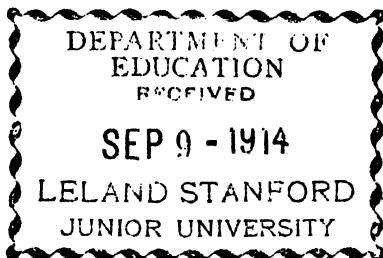
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How many quarts are there in a gallon? What part of a gallon is a quart? How many times a quart is a gallon? How many pints are there in a gallon? How many times a pint is a gallon? What part of a gallon is a pint? Repeat the table of liquid measure.

1. If 8 chairs are worth \$18, how much is one chair worth at that rate?
2. What part of 45 is 9?
3. Two pints of molasses were drawn from a gallon jug. What part of the jug remained full?
4. A boy received 9 credits in arithmetic, 8 in penmanship, 7 in reading. What was his average mark?
5. If 5 blank books cost \$ $\frac{1}{2}$ , how much will 15 blank books cost?

---

Rapidly multiply:

15	12	13	14	15	16	17	18	19	20	21	22	23	24	25
<u>9</u>	<u>8</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>

Count by 7's from 22 to 106. Count by 6's from 27 to 105.

How many gills are there in a pint? in a quart? in a gallon?

A gill is what part of a pint? of a quart? of a gallon?

6. A jug contains 3 quarts when it is  $\frac{3}{4}$  full. How much does it hold when full?
7. 24 is what part of 36?
8. How many thousandths are there in .01500?
9. Change 16.0 to hundred-thousandths.
10. Change  $\frac{1}{80}$  to a decimal.

**Written.**

1. Write in words the following decimals: .16; .138; .003; .0708; .605; .7605; .76006; .00312; .14036; .00035.

2. Write in numbers: twenty-five hundred; twenty-five hundredths; twenty-five thousand; twenty-five thousandths; five hundred twenty-five thousandths; three hundred seventy-eight ten-thousandths; fifty thousand six hundred seven hundred-thousandths.

3. Reduce  $\frac{3}{16}$  to a decimal.

4. Reduce  $\frac{2}{125}$  to a decimal.

5. A person having  $271\frac{1}{2}$  acres of land sold  $\frac{1}{3}$  of it to one man and  $\frac{2}{3}$  of it to another man. What was the value of the remainder at \$57 $\frac{1}{2}$  an acre?

6. Write as common fractions and as decimals: seventy-five thousandths; fifteen hundredths; seven thousandths; fifty-three thousandths; nine ten-thousandths; twenty-two ten-thousandths.

7. Reduce  $\frac{22}{200}$  to a decimal.

8. Reduce  $\frac{3}{125}$  to a decimal.

9. Five eighths of 120 is  $\frac{5}{8}$  of what number?

10. If  $7\frac{1}{2}$  tons of hay cost \$120, how many tons can be bought for \$78?

**V****Oral.**

Rapidly divide the numerator by the denominator:

$\frac{270}{90}$ ;  $\frac{560}{70}$ ;  $\frac{2400}{120}$ ;  $\frac{360}{60}$ ;  $\frac{420}{20}$ ;  $\frac{1080}{12}$ ;  $\frac{4500}{600}$ ;  $\frac{720}{80}$ ;  $\frac{360}{80}$ ;  $\frac{3100}{90}$ .

How many decimal places are necessary to express hundredths? ten-thousandths? thousandths? hundred-thousandths?

Read: .008; .5607; .75; .7500; .00172.

1. Reduce .00060 to lowest decimal terms.
2. Reduce .64 to hundred-thousandths.
3. Change  $\frac{3}{8}$  to a decimal.
4. If 4 pears cost \$.07, how many pears can I buy for \$.21? (Use the ratio method.)
5. If  $\frac{5}{8}$  of a yard costs \$.35, how much will 1 yd. cost? How much will 6 yd. cost?

Rapidly divide the numerator by the denominator:

$$\begin{array}{cccccc} \frac{240}{6}; & \frac{240}{60}; & \frac{680}{4}; & \frac{680}{40}; & \frac{516}{30}; & \frac{4 \times 3}{6}; \\ \frac{7 \times 2}{14}; & \frac{850}{50}; & \frac{900}{20}; & \frac{720}{6}; & \frac{840}{7}; & \frac{6 \times 5}{10}. \end{array}$$

Read: .0675; 125.125; 125000.125; .00782; .12345.

6. Reduce  $.4\frac{1}{8}$  to a pure decimal.
7. Reduce  $.04\frac{1}{4}$  to a pure decimal.
8. Reduce  $.04\frac{1}{4}$  to a common fraction.
9. What fraction added to  $\frac{3}{8}$  will equal  $\frac{5}{8}$ ?
10. The sum of two fractions is  $\frac{1}{2}$ ; one of them is  $\frac{1}{8}$ . What is the other?

Written:

1. Add .2, .05, .008, .7283, .0005, 6.25, 8.1, .97, .0101, 70, .0275, .0085, and .1754.
2. If 29 chairs are worth \$101.50, how much will 55 chairs be worth at the same rate?
3. I bought 318 yd. of muslin @ 39¢ a yard. How much change did I receive from a check of \$136?

4. If 172 A. of land cost \$860, how much will 275 A. cost?
5. How much will 1 bbl. of flour cost, if 3 bbl. cost \$18 $\frac{3}{4}$ ?

---

6. Add \$125, \$6.35, \$2.125, \$.08 $\frac{1}{2}$ , and \$11.55.
7. Divide  $\frac{5}{8}$  by  $\frac{3}{4}$ , and reduce the answer to a decimal fraction.
8. If 75 T. of coal cost \$487.50, how much will 38 T. cost at the same rate?
9. Add 12 $\frac{1}{4}$ , 6 $\frac{3}{8}$ , 8 $\frac{1}{2}$ , 15 $\frac{5}{8}$ , 4 $\frac{3}{8}$ , 7 $\frac{5}{8}$ , and 15 $\frac{7}{8}$ .
10. 85 is what part of 120? Give the answer in the form of a common fraction and also of a decimal fraction.

## VI

## Oral.

Rapidly read as hundredths :

$\frac{1}{2}$ ;  $\frac{3}{8}$ ;  $\frac{1}{8}$ ;  $\frac{1}{4}$ ;  $\frac{1}{7}$ ;  $\frac{5}{8}$ ;  $\frac{2}{7}$ ;  $\frac{1}{8}$ ;  $\frac{1}{9}$ ;  $\frac{3}{7}$ ;  $\frac{3}{8}$ ;  $\frac{4}{7}$ ;  $\frac{2}{9}$ ;  $\frac{2}{9}$ ;  $\frac{3}{4}$ .

Read: .8; .17; .017; .003; 45.45; 45.0045; .64; .18 $\frac{3}{4}$ ; .12 $\frac{1}{2}$ ; .00375.

1. Change  $\frac{3}{25}$  to a decimal.
2. Reduce .55 to a common fraction.
3. Find .80 of 25.
4. Find the cost of 24 boxes of note paper at the rate of 12 $\frac{1}{2}$ ¢ a box.
5. A man having \$75, spent  $\frac{2}{3}$  of it. How much did he spend? How much had he left?



Rapidly read as hundredths :

$\frac{2}{4}$ ;  $\frac{1}{3}$ ;  $\frac{1}{5}$ ;  $\frac{1}{10}$ ;  $\frac{2}{5}$ ;  $\frac{5}{7}$ ;  $\frac{5}{8}$ ;  $\frac{4}{5}$ ;  $\frac{6}{7}$ ;  $\frac{7}{8}$ ;  $\frac{4}{9}$ ;  $\frac{5}{9}$ ;  $\frac{7}{9}$ ;  $\frac{8}{9}$ ;  $\frac{1}{12}$ .

Read : .009; 7.007; 65.6; 700.007; .3047; .0375;  
.125; .00625; .50003; 50000.00003.

6. If  $\frac{4}{5}$  of a quart of pears costs 16¢, how much does a quart cost?

7. A boy spent 20¢, which was  $\frac{5}{8}$  of his money. How much money had he?

8. If  $\frac{2}{3}$  of a farm is worth \$800, how much is the entire farm worth?

9. If  $\frac{5}{8}$  of an acre of land contains 80 lots, how many lots are there to an acre?

10. In a class of 45 pupils, 20 of the number are girls. What part of the class is girls?

### Written.

1. Add: \$140.16  
2918.69  
74.96  
4808.83  
3681.28  
29.91  
745.55  
90.87  
57.72  
6533.84  
412.40  
874.32  
48.63

2. Reduce  $72\frac{2}{16}$  to an improper fraction.

3. Reduce  $1\frac{4}{5}$  to lowest terms.  
Reduce  $1\frac{1}{3}$  to lowest terms.  
(Use the g. c. d.)

4. If a man travels at the rate of 240 mi. in  $5\frac{3}{4}$  da. how far will he travel in  $3\frac{1}{2}$  da.? How far will he travel in  $6\frac{1}{2}$  da.?

5. Reduce .006500 to lowest decimal terms. Reduce .075000 to lowest decimal terms.

- |   |   |
|---|---|
| <p>6. Add: 456.782<br/>               26.3405<br/>              8765.56<br/>              945.78923<br/>              389.654<br/>              4678.4738<br/>               31.25<br/>               1.059<br/>              126.5<br/>              <u>1235.615</u></p> | <p>7. At the rate of 15 eggs<br/>         for 25¢, how much will 10<br/>         dozen cost?</p> <p>8. How much will <math>24\frac{1}{4}</math> lb.<br/>         of butter cost at the rate of<br/>         15 lb. for \$4.80?</p> <p>9. To the sum of <math>6\frac{1}{8}</math> and<br/> <math>19\frac{3}{8}</math>, add the difference be-<br/>         tween them.</p> <p>10. What part of 75 is 45?</p> |
|---|---|

Give the answer in hundredths.

## VII

### Oral.

Rapidly read as common fractions in their lowest terms:

$.12\frac{1}{2}$ ; .35; 45;  $.37\frac{1}{2}$ ;  $.66\frac{2}{3}$ ;  $.08\frac{1}{3}$ ;  $.16\frac{2}{3}$ ;  $.14\frac{2}{7}$ ; .50;  
 .05; .005; .25; .025; .0025; .875.

What change takes place in the value of the decimal when the decimal point is moved 1 place to the right? two places? three places? four places? What change takes place in the value of the decimal when the decimal point is moved 1 place to the left? two places? three places? four places? five places?

1. If I paid \$16 for coffee at 25¢ a pound, how many pounds did I buy?
2. How many 50¢ balls can be bought for \$14?
3. A farmer paid \$24 for corn at the rate of 75¢ a bushel. How many bushels did he buy?
4. How much will 25 yd. of cloth cost at 25¢ a yard?
5. Find the cost of 32 geographies at 75¢ each.

Rapidly read as common fractions in their lowest terms: .375; .125; .075; .75;  $.33\frac{1}{3}$ ;  $.28\frac{1}{4}$ ;  $.62\frac{1}{2}$ ; .20; .80; .60; .40; .08; .04; .65;  $.11\frac{1}{5}$ .

Tell the shortest way of dividing a decimal by 10; by 20; by 100; by 500; by 1000; by 2000.

Tell the shortest way of multiplying a decimal by 10; by 20; by 80; by 100; by 600; by 1000; by 2000.

6. Eighteen hours is what part of a day?

7. Eighteen hours is how many hundredths of a day?

8. What is the sum of  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{7}{8}$ ?

9. I sold a picture for \$30 which was  $\frac{3}{8}$  of the price it cost me. How much did it cost me? How much money did I lose by selling it at \$30?

10. If  $3\frac{1}{2}$  lb. cost  $\$7\frac{7}{8}$ , how many pounds can be bought for \$5?

### Written.

1. Simplify  $\frac{2}{3}$  of  $\frac{3}{4}$  of  $\frac{4}{5}$  of  $2\frac{1}{2}$ .

2. Find the value of  $\frac{5}{8}$  of  $\frac{3}{4}$  of  $\frac{8}{9}$  of  $\frac{7}{15}$  of  $\frac{1}{2}\frac{1}{4}$ .

3. If a man spends \$1686, which is  $\frac{3}{4}$  of his income, how much is his income?

4. A farmer having 480 bu. of wheat, sells  $\frac{3}{8}$  of it. How many bushels does he sell?

5. From the sum of  $18\frac{7}{10}$  and  $25\frac{3}{8}$ , take the difference between them.

6. What is  $\frac{6}{7}$  of  $\frac{8}{15}$  of  $2\frac{1}{8}$ ?

7. If a tailor pays  $\$6\frac{1}{4}$  for a yard of velvet, how much is  $\frac{2}{5}$  of a yard worth?

8. Henry has  $\frac{5}{8}$  of 4 qt. of apples and Mary has  $\frac{4}{5}$  as many as Henry. How many has Mary?

9. Jane went to the store with \$15 $\frac{1}{2}$ , and spent  $\frac{2}{3}$  of  $\frac{3}{4}$  of it. How much did she spend?

10. What is the sum of  $\frac{2}{3}$ ,  $\frac{5}{6}$ , and  $\frac{7}{8}$ ?

## VIII

Oral.

Rapidly find :

$\frac{2}{3}$  of  $\frac{3}{4}$ ;  $\frac{3}{4}$  of  $\frac{5}{6}$ ;  $\frac{2}{3}$  of  $\frac{5}{6}$ ;  $\frac{3}{4}$  of  $\frac{4}{5}$ ;  $\frac{1}{2}$  of  $\frac{4}{5}$ ;  $\frac{3}{2} \times \frac{2}{3}$ ;  $\frac{4}{7} \times \frac{7}{8}$ ;  $\frac{1}{2} \times \frac{6}{7}$ ;  $\frac{2}{3}$  of  $\frac{6}{7}$ ;  $\frac{3}{4}$  of  $\frac{8}{9}$ .

(Such an expression as  $\frac{1}{2}$  of  $\frac{3}{4}$  or  $\frac{3}{4} \times \frac{1}{2}$  is often called a **compound fraction**, or a fraction of a fraction.)

Read :

MCM; CDCCV; MCCCCLXXXVIII; MDCCLVIII; XCIX; DCCCXCV; 1008760; 26785005; 8300005007; 50000; 50000000.

1. If an automobile travels from New York to Albany, a distance of 146 miles, in 8 hours, what is its average rate per hour?

2. When Charles has read  $\frac{1}{3}$  of a 200-page book, how many pages has he left to read?

3. Twenty quarts is what part of a bushel?

4. A club bought 20 baseballs at \$ $\frac{3}{4}$  each. How much did they cost all together?

5. When silk is selling at 76¢ per yard, what will be the cost of  $\frac{1}{4}$  of a yard? \_\_\_\_\_

Rapidly find :

$\frac{9}{10} \times \frac{5}{6}$ ;  $\frac{1}{2} \times \frac{5}{6}$ ;  $\frac{1}{3} \times \frac{2}{7}$ ;  $\frac{6}{7} \times \frac{3}{5}$ ;  $\frac{5}{8} \times \frac{8}{9}$ ;  $\frac{1}{3}$  of  $\frac{1}{5}$ ;  $\frac{1}{3}$  of  $\frac{4}{5}$ ;  $\frac{3}{5}$  of  $\frac{5}{6}$ ;  $\frac{4}{5}$  of  $\frac{7}{8}$ ;  $\frac{3}{4}$  of  $\frac{1}{16}$ .

How may a compound fraction be reduced to a simple fraction?

Read: CCXCVIII; MXCX; DCCCCLXXXVII; LVI; CCLI; 85976000; 327600450; 50000.050; 45087; 378.05628.

6. A newsboy sold 54 papers at 3¢ each. If the papers cost him 95¢, what was his profit?

7. How much will  $\frac{1}{2}$  of a barrel of flour cost at 3¢ a pound?

8. If I pay  $\$ \frac{3}{4}$  for a book,  $\$ \frac{1}{2}$  for an inkstand, and  $\$ \frac{1}{4}$  for writing paper, how much change do I get from a two-dollar bill?

9. How many fourths are there in  $24\frac{1}{4}$ ?

10. If a man earns  $\$14\frac{1}{2}$  in a week, and spends  $\$8\frac{3}{4}$ , how much does he save?

#### Written.

1. A man worked from the 1st of May to the 1st of October at \$2.25 a day, and during this time there were 21 Sundays and holidays. How much did he earn?

2. If 35 yards of cloth cost \$140, how much will 95 yd. of the same cloth cost? \*

3. How many barrels of onions, at \$31 a barrel, must be given for 21 boxes of raisins, at \$2 a box?

4. John bought 9 yd. of cloth at  $\$ \frac{3}{4}$  a yard, and had \$7 remaining. How much had he at first?

5. A man spent  $\frac{1}{8}$  of his salary for rent,  $\frac{1}{20}$  for amusements,  $\frac{1}{4}$  for food, and had \$640 left. What were his wages?

\* SUGGESTION:  $\frac{\$140 \times 95}{35} = ?$

6. A fund of \$25180.75 was applied to the relief of 18000 persons. What was the allowance per person?

7. A man bequeathed to his wife \$36000, which was  $\frac{8}{17}$  of his estate. The remainder was divided equally among his 3 children. How much did each child receive?

8. A boy has  $\$3\frac{7}{10}$  with which to buy a dog worth  $\$5\frac{3}{4}$ . How much more money must he get?

9. If a stack of oats will serve 25 horses 9 days, how many days will it serve 15 horses, eating at the same rate?

10. If a farmer sells 25 bu. of wheat at 60¢ a bushel and takes his pay in cloth at 40¢ a yard, how many yards of cloth does he get?

## IX

### Oral.

Rapidly divide:

$\frac{4}{5}$  by 4;  $\frac{6}{7}$  by 2; 8 by  $\frac{3}{5}$ ; 18 by  $\frac{6}{7}$ ;  $\frac{3}{4}$  by  $\frac{1}{4}$ ;  $\frac{5}{8}$  by  $\frac{3}{8}$ ;  $\frac{5}{8}$  by  $\frac{2}{16}$ ;  $\frac{5}{7}$  by 10;  $\frac{5}{8}$  by  $\frac{7}{8}$ ;  $\frac{3}{8}$  by  $\frac{4}{8}$ ;  $\frac{3}{8}$  by  $\frac{3}{8}$ ; 1 by  $\frac{3}{8}$ ; 1 by  $\frac{4}{5}$ .

1. At  $\$ \frac{2}{5}$  a yard, how many yards of ribbon can I buy for \$1?

2. If 3 cakes cost  $\frac{2}{10}$  of a dime, how many cents will one cake cost?

3. If  $6\frac{2}{3}$  mi. of railroad track cost \$6500, how much is 1 mi. worth?

4. If  $1\frac{3}{8}$  rolls of twine will let a kite go out 500 yd., how far will  $2\frac{1}{2}$  rolls let the kite go? 1 roll?

5. Reduce the compound fraction  $\frac{5}{8}$  of  $\frac{8}{10}$  to a simple fraction.

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Rapidly divide :

12 by  $1\frac{1}{2}$ ; 15 by  $1\frac{1}{2}$ ; 30 by  $2\frac{1}{2}$ ; 70 by  $2\frac{1}{2}$ ;  $11\frac{1}{4}$  by 5;  
 $3\frac{3}{4}$  by  $\frac{3}{4}$ ;  $5\frac{5}{8}$  by  $\frac{5}{8}$ ;  $4\frac{4}{5}$  by  $\frac{4}{5}$ ; 1 by  $\frac{8}{9}$ ; 1 by  $\frac{1}{5}$ .

6. A man measures the length of a street by taking 33 steps of 3 ft. each. How long is the street in rods?

7. Three railroad tickets at full price and one at half price cost 42¢. What is the price of a single ticket?

8. If  $1\frac{1}{2}$  lb. of meat cost 36¢, how much will  $\frac{3}{4}$  of a pound cost?

9. At  $\$ \frac{4}{5}$  a pound, how much tea will \$1 buy?

10. At  $\$ \frac{3}{4}$  each how many baseballs will \$12 buy?

Written.

1. If  $\frac{3}{4}$  of a farm cost \$6270, how much did the whole farm cost?

2. At  $\$ 3\frac{3}{5}$  a cord, how many cords of wood can be bought for \$153?

3. At  $\$ 6\frac{1}{5}$  a bushel, how many bushels of clover seed can be bought for \$43.40?

4. At  $\frac{1}{4}$  of  $\$ \frac{4}{5}$  a yard, how many yards of muslin can be bought for  $\frac{1}{5}$  of  $\$ \frac{9}{10}$ ?

5. What is the value of  $(\frac{2}{3}$  of  $\frac{5}{8}$  of  $13\frac{1}{2} + 7\frac{2}{3}) \div (10\frac{1}{2} - 7\frac{5}{12})$ ?

6. From  $100\frac{3}{4}$  T. of iron  $40\frac{3}{4}$  T. were sold at  $\$ 42\frac{1}{2}$  a ton, and the remainder was sold at  $\$ 40\frac{1}{4}$  per ton. How much was received for all?

7. If  $\frac{2}{3}$  of a farm is worth  $\$ 1729\frac{1}{2}$ , what is the value of the farm? of  $\frac{3}{8}$  of it?

8. A pole stands  $\frac{1}{8}$  in the mud,  $\frac{1}{4}$  in the water, and 35 ft. above the water. What is the length of the pole in feet?

9. What is the value of  $(\frac{3}{5} \text{ of } \frac{6}{11} + 15) \times (15 + \frac{3}{4} \text{ of } \frac{6}{7})$ ?

10. Simplify  $(12\frac{3}{8} + 1\frac{1}{12} - 15\frac{5}{9} \times \frac{1}{3}) \times 4$ .

### X

#### Oral.

Rapidly answer :

$45 + 15 = ?$	$60 - 16 = ?$	$17 \times 5 = ?$	$95 \div 5 = ?$
$16 + 75 = ?$	$60 - 48 = ?$	$18 \times 4 = ?$	$51 \div 3 = ?$
$69 + 12 = ?$	$81 - 13 = ?$	$19 \times 3 = ?$	$96 \div 16 = ?$
$14 + 48 = ?$	$82 - 68 = ?$	$23 \times 4 = ?$	$72 \div 18 = ?$

How many pints are there in a peck? A quart is what part of a peck?

A bushel is how many times a quart? A peck is how many times a pint?

What part of a bushel is a peck? Repeat the table of dry measure.

1. How many quarts are there in 3 pk.?

2. If a quart of apples costs 15¢, how much will a bushel cost?

3. What part of a gallon are 2 qt.?

4. A gallon of maple sirup costs \$1.50. How much is it a quart?

5. A man walked 28.33 mi. in 7 hr. At what rate per hour did he travel? \_\_\_\_\_



Rapidly answer :

$19 + 26 = ?$	$45 - 16 = ?$	$24 \times 4 = ?$	$96 \div 4 = ?$
$38 + 13 = ?$	$45 - 27 = ?$	$26 \times 3 = ?$	$78 \div 26 = ?$
$18 + 42 = ?$	$63 - 18 = ?$	$27 \times 2 = ?$	$80 \div 5 = ?$
$54 + 17 = ?$	$64 - 49 = ?$	$28 \times 3 = ?$	$54 \div 27 = ?$

How many quarts are there in a peck? A pint is what part of a quart?

A bushel is how many times a pint? For what is the table of dry measure used? Repeat the table of dry measure.

6. In 2 bu. 1 pk. 6 qt. how many quarts are there?
7. In 64 qt. how many pecks are there?
8. If you should draw 10 gal. and 3 qt. from a hogshead of molasses (63 gal.), how many gallons would remain? What part of the hogshead would remain?
9. A pane of glass contains 960 sq. in. It is 32 in. long. How wide is it?
10. A farmer raised 85 bu. of potatoes. He kept 15 bu. At  $\$ \frac{1}{2}$  a bushel how much would the rest bring?

Written.

1.  $\frac{2}{3}$  of  $\frac{4}{5}$  of  $\frac{3}{4}$  of a bushel equals how many pints?
2. At 5¢ a quart, how many gallons of cider can be bought for \$4?
3. A fruit dealer bought  $1\frac{1}{4}$  bu. of huckleberries at 60¢ a peck, and sold them at 10¢ a quart. How much did he gain on the berries?
4. At 5¢ a quart how much will  $12\frac{3}{4}$  bu. of beans cost?

5. At  $\$22\frac{1}{2}$  an acre, how many acres of land can be bought for  $\$4234\frac{1}{2}$ ?

6. What will be the cost of 128 pt. of chestnuts at  $\$3.50$  a bushel?

7. What will be the cost of 360 qt. of milk at 32¢ a gallon?

8. From the sum of  $18\frac{7}{10}$  and  $25\frac{3}{8}$  take their difference.

9. From a bin containing  $25\frac{3}{8}$  bu. of grain there were taken out at one time  $5\frac{3}{4}$  bu., and at another  $6\frac{1}{2}$  bu. How many bushels remained in the bin?

10. Add 123427, 34825, 775, 716, 8976, 37412, 567356, and 39723.

## XI

### Oral.

Rapidly answer :

$\frac{1}{2} + \frac{1}{4} = ?$	$\frac{1}{2} - \frac{1}{4} = ?$	$\frac{1}{2} \times \frac{1}{4} = ?$	$\frac{1}{2} \div \frac{1}{4} = ?$
$\frac{1}{2} + \frac{1}{8} = ?$	$\frac{1}{2} - \frac{1}{8} = ?$	$\frac{1}{2} \times \frac{1}{8} = ?$	$\frac{1}{2} \div \frac{1}{8} = ?$
$\frac{1}{3} + \frac{1}{4} = ?$	$\frac{1}{3} - \frac{1}{4} = ?$	$\frac{1}{3} \times \frac{1}{4} = ?$	$\frac{1}{3} \div \frac{1}{4} = ?$
$\frac{1}{2} + \frac{1}{5} = ?$	$\frac{1}{2} - \frac{1}{5} = ?$	$\frac{1}{2} \times \frac{1}{5} = ?$	$\frac{1}{2} \div \frac{1}{5} = ?$

Count by 9's from 16 to 106. Count by 8's from 13 to 101. Five is what part of 10? Multiply 18 by 10 and divide the product by 2. Multiply 18 by 5.

Multiply a number by 10 and then divide by 2 and multiply the same number by 5. Is there any difference in the result? Why?

1. How many bushels of apples can a man pick in 10 da. at the rate of 26 bu. a day? What part can he pick in 5 da.? How many bushels can he pick in 5 da.?

2. How many bushels of apples can he pick in 5 da. if he picks 36 bu. a day?

3. At 12¢ each, how much will 10 grapefruits cost? 5 grapefruits?

4. Find the cost of 5 tables at \$19 each, 5 chairs at \$7.50 each, and 5 couches at \$35 each.

5. Hannah can make a dress in  $3\frac{3}{4}$  da. What part of the work could she do in 1 da.?

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Rapidly answer:

$\frac{1}{4} + \frac{1}{6} = ?$	$\frac{1}{4} - \frac{1}{6} = ?$	$\frac{1}{4} \times \frac{1}{6} = ?$	$\frac{1}{4} \div \frac{1}{6} = ?$
$\frac{1}{4} + \frac{1}{8} = ?$	$\frac{1}{4} - \frac{1}{8} = ?$	$\frac{1}{4} \times \frac{1}{8} = ?$	$\frac{1}{4} \div \frac{1}{8} = ?$
$\frac{1}{8} + \frac{1}{6} = ?$	$\frac{1}{8} - \frac{1}{6} = ?$	$\frac{1}{8} \times \frac{1}{6} = ?$	$\frac{1}{8} \div \frac{1}{6} = ?$
$\frac{1}{8} + \frac{1}{8} = ?$	$\frac{1}{8} - \frac{1}{8} = ?$	$\frac{1}{8} \times \frac{1}{8} = ?$	$\frac{1}{8} \div \frac{1}{8} = ?$

$$5 \times ? = 60; \quad 72 \div ? = 9; \quad ? \times 18 = 54; \quad ? + 20 = 600.$$

6. What is the shortest method of multiplying any number by 5? Multiply the following numbers by 5: \$26; \$2.85; \$10.80; \$9.50; \$16.50; \$75; \$30; \$120.

7. One package of nasturtium seeds contains 45 seeds. How many seeds are there in 5 packages? If only .10 of the seeds become plants, how many plants will there be?

8. There are 12 doz. crayons in a box. How many are there in 5 boxes? How many gross are there in a box? How many dozen crayons equal 1 gross? How many gross equal 1 great gross?

9. How much will 2 gross of pens cost at 5¢ a dozen?

10. I bought a gross of penholders for \$1 and sold them at a cent each. How much did I gain?

**Written.**

1. What distance will be covered in walking five times around a track that is 135 yd. around?

2. A stationer bought 10 gross of pens at 45¢ per gross, and retailed them at 2 for a cent. How much did he gain?

3. A butcher paid \$8.68 for  $108\frac{1}{2}$  lb. of beef, and sold it at 15¢ per pound. What was his profit?

4. At  $\$ \frac{4}{5}$  a yard what will be the cost of  $40\frac{1}{5}$  yd. of flannel?

5. A boy had  $\$15\frac{3}{4}$  after spending  $\$12\frac{1}{2}$  for a suit of clothes. How much money had he at first?

6.  $(867 \times 97) \div (200 \times 5 \times 3) = ?$

7. A man having \$4578, paid out all but \$1642 in 8 wk. How much on an average was paid out each week?

8. A merchant bought three kinds of tea, some at 60¢, some at 78¢, and some at 90¢ a pound. What was the average cost a pound?

9. A dealer bought a great gross of lead pencils at \$1.25 a gross, and sold them at the rate of 2 for 5¢. How much did he gain?

10. Mr. Johnson bought a farm 198 rd. long and 150 rd. wide at \$64 an acre. What was the entire cost?

**XII****Oral.**

Rapidly reduce to 48ths:

$\frac{1}{2}; \frac{1}{3}; \frac{1}{6}; \frac{2}{3}; \frac{5}{6}; \frac{1}{4}; \frac{1}{8}; \frac{3}{4}; \frac{5}{8}; \frac{7}{8}; \frac{1}{12}; \frac{8}{9}; \frac{5}{12}; \frac{7}{12}.$

Rapidly multiply by 5:

320; 46; 87; 92; 56; 136; 2.8; 45.6; 38.2; 76.4.

One dozen is what part of a gross? A great gross is how many times a gross? How many units equal a score? A quire of paper contains how many sheets of paper? How many quires equal a ream?

1. How much will 1 ream of paper cost at 20¢ a quire?

2. How old is a man who is 3 score and ten years old?

3. How much will 5 lb. of spring chicken cost at 18¢ a pound?

4. Reduce the compound fraction  $\frac{5}{8}$  of  $\frac{4}{15}$  to a simple one. Reduce the answer to a decimal fraction of 2 places.

5. How many quires are there in 20 reams?

Rapidly reduce to 72ds:

$\frac{3}{4}$ ;  $\frac{1}{2}$ ;  $\frac{3}{4}$ ;  $\frac{1}{6}$ ;  $\frac{1}{4}$ ;  $\frac{5}{6}$ ;  $\frac{1}{12}$ ;  $\frac{1}{9}$ ;  $\frac{5}{12}$ ;  $\frac{7}{9}$ ;  $\frac{5}{8}$ ;  $\frac{1}{3}$ ;  $\frac{7}{12}$ ;  $\frac{7}{8}$ .

Rapidly multiply by 5:

2.1; 7.8; 375; 37.5; 48; 4.8; .48; 720; 7.2; 2.48.

6. Find the cost of 1.25 gross of pens at 8¢ a dozen.

7. At \$4 a bushel how much will 3 pk. and 4 qt. of berries cost?

8. If a man receives \$1.75 for a day's work, how much does he receive for 100 days' work? for 5 days' work?

9. If there are 5 qt. and 1 pt. of berries in 1 pail and 7 qt. and 1 pt. in another, how many pecks and quarts are there in both pails?

10. A boy runs around a block which is 200 ft. long and 180 ft. wide. How many yards does he run?

**Written.**

1. Robert James bought of Cristede Bros., New York City, Sept. 8, 1910, 36 lb. of bacon at 28 ¢; 40 lb. of lard at 15 ¢; 15½ lb. of sausage at 18 ¢.

In the above bill, which party owes a debt? To which party is the debt owed? Who is the debtor? Who is the creditor? Write the bill using a form like the one below.

PLACE, DATE	
NAME, ADDRESS	
To	Dr.
ADDRESS	
YEAR DATE	

2. Mrs. Susan Thompson bought 1 bbl. sugar (245 lb.) at 3 ¢; 8 lb. oatmeal at 4 ¢; 3 lb. honey at 12 ¢; 2 bags flour at 75 ¢; 4 lb. raisins at 2 lb. for 25 ¢; 8 doz. eggs at 25 ¢; 5 lb. coffee at 17 ¢. Write this bill in proper form, and find the total cost.

3. Mary Brown bought of Stern & Ball, April 5, 1910, 16 yd. lace at  $12\frac{1}{2}$  ¢; 14 yd. muslin at 25 ¢; April 14, 18 yd. silk at \$1.25; April 22, 1 apron at 75 ¢. Make out the bill in proper form, and receipt the bill for Stern & Ball, May 5.

4. Buy from your grocer the following articles at prevailing prices. Put in bill form, write the total cost, and properly receipt for payment. Butter, 1 lb.; cream of wheat, 1 pkge.; potatoes, 2 qt.; string beans, 1 qt.; cucumbers, 3; tomatoes, 3 pk.; onions, 3 bunches; radishes, 2 bunches; tea, 1 lb.; coffee, 5 lb.; sugar,  $3\frac{1}{2}$  lb.

In the above example who is the debtor? the creditor?

5. Find the decimal value of:

$$\$48\frac{15}{100} + \$.97 - (\$.4 + \$.62\frac{1}{2} + \$.5).$$

6. You bought a ton of coal for  $\$6\frac{1}{2}$ , a barrel of sugar for  $\$18\frac{7}{10}$ , a chest of tea for \$13.45, and a barrel of flour for  $\$6\frac{1}{2}$ . Consider yourself the debtor, and make a bill in proper form. Use any firm's name as the creditor.

7. Reduce  $\frac{17}{820}$  to millionths.

8. Find the difference between 83.7 and 45.392.

9. Find the sum of  $3\frac{1}{4}$ ,  $2\frac{1}{2}$ ,  $18\frac{7}{8}$ , and  $\frac{3}{16}$  decimally.

10. Reduce  $\frac{1244}{1638}$  to its lowest terms by use of the greatest common divisor.

### XIII

#### Oral.

Rapidly change each of the following to inches:

$\frac{1}{2}$  yd.;  $\frac{1}{4}$  yd.;  $\frac{5}{8}$  yd.;  $\frac{5}{12}$  yd.;  $\frac{7}{8}$  yd.;  $\frac{1}{12}$  yd.;  $\frac{3}{8}$  yd.;  $\frac{5}{16}$  yd.;  $\frac{3}{4}$  yd.;  $\frac{1}{8}$  yd.;  $\frac{1}{6}$  yd.;  $\frac{1}{18}$  yd.;  $\frac{4}{9}$  yd.

$18 + ? = 36$ ;  $? - 18 = 36$ ;  $36 \times ? = 180$ ;  $? \div 6 = 13$ ?

1. In carrying messages John rides on his bicycle to one place  $\frac{3}{4}$  of a mile away and to another  $\frac{4}{5}$  of a mile farther. Going one way what distance does he cover?

2. If a boy spends  $\frac{1}{5}$  of his money on Monday,  $\frac{2}{10}$  of it on Tuesday, and  $\frac{7}{15}$  of it on Wednesday, what part of it does he spend? What part of it has he left? If he had \$3 on Monday morning, how much money has he Wednesday evening?

3. A colt cost me \$60 and  $1\frac{1}{5}$  times the cost of my colt was  $\frac{1}{2}$  of the cost of my horse. How much did my horse cost me?

4. Find the value of  $\frac{1}{3} + \frac{1}{4} - \frac{1}{2}$ .

5. I owned  $\frac{2}{3}$  of a ship and sold  $\frac{1}{4}$  of my share. What part of the ship do I still own?

Rapidly change each of the following to pints:

$\frac{1}{2}$  bu.;  $\frac{1}{2}$  pk.;  $\frac{1}{3}$  bu.;  $\frac{5}{8}$  bu.;  $\frac{1}{8}$  pk.;  $\frac{1}{2}$  bu.;  $\frac{7}{8}$  bu.;  $\frac{3}{8}$  pk.;  $\frac{7}{8}$  bu.;  $\frac{3}{16}$  bu.;  $\frac{3}{4}$  bu.;  $\frac{1}{4}$  pk.;  $\frac{1}{4}$  bu.;  $\frac{1}{16}$  bu.;  $\frac{3}{4}$  pk.;  $\frac{1}{16}$  bu.;  $\frac{7}{16}$  bu.;  $\frac{7}{8}$  pk.;  $\frac{2}{16}$  bu.;  $\frac{3}{8}$  bu.

Count by 11's from 7 to 117. Count by 13's from 6 to 110.

6. Of a bookseller's collection  $\frac{1}{6}$  are maps,  $\frac{2}{3}$  are books, and the rest are periodicals. The periodicals are what part of the collection?

7. I owned  $\frac{2}{3}$  of a ship and sold  $\frac{1}{4}$  of my share for \$20,000. What was the value of the ship?

8. Find  $\frac{5}{6}$  of  $\frac{7}{10}$ ;  $\frac{2}{3}$  of  $\frac{7}{9}$ ;  $\frac{3}{4}$  of  $\frac{2}{5}$ ;  $\frac{2}{5}$  of  $\frac{2}{3}$ . What do we call these expressions?

9. In 2.6 how many ten-thousandths are there?



10. What fractional part of \$25 is  $\$ \frac{1}{2}$ ? What decimal part?

**Written.**

1. Write in numbers: sixty thousand and three thousandths; sixty three thousandths.

2. Reduce 12.725 to a common fraction.

3. Find the value of  $(\frac{2}{3}$  of  $\frac{5}{8}$  of 16)  $\div$   $(\frac{2}{5}$  of  $\frac{3}{4}$  of  $5\frac{1}{2}$ ).

4. A person having  $110\frac{2}{3}$  acres of land sold  $\frac{1}{3}$  of it to one man and  $\frac{2}{3}$  of it another. What was the value of the remainder at \$65 an acre?

5. Reduce  $\frac{1}{20}$  of  $\frac{1}{2}\frac{2}{3}$  to a decimal.

6. Add: \$20.08

821.48

3694.61

746.45

5609.03

7094.68

776.89

289.73

2530.14

95.28

4643.67

708.95

7. A man owning  $\frac{1}{16}$  of a ship, sold  $\frac{2}{5}$  of his share and divided the remainder equally among his three sons. What part of the ship did each son own?

8. Find the sum of  $4\frac{1}{2}$  E.,  $\$75\frac{1}{2}$ ,  $20\frac{1}{4}$  d.,  $8\frac{1}{2}$  ¢, and 14 mills.

9. What part of 152 is 133? Give the answer in a decimal fraction.

10. How many telegraph poles placed 40 yd. apart will be needed for wires to extend from Boston to New York, if the distance is 230 mi.? (The first pole must be included in the answer.)

## XIV

## Oral.

Rapidly reduce the following common fractions to decimals :

$\frac{7}{8}$ ;  $\frac{3}{4}$ ;  $\frac{13}{20}$ ;  $\frac{5}{12}$ ;  $\frac{7}{12}$ ;  $\frac{5}{6}$ ;  $\frac{12}{25}$ ;  $\frac{2}{3}$ ;  $\frac{1}{16}$ ;  $\frac{7}{25}$ ;  $\frac{17}{20}$ ;  $\frac{8}{9}$ ;  $\frac{4}{5}$ ;  $\frac{5}{8}$ ;  $\frac{3}{8}$ .

What is the standard coin of France called ?

(The value of a franc in United States money is  $19\frac{3}{10}$ ¢ or in even money 20¢.)

1. If while in France you spend 5 francs for a carriage ride, about how much does this equal in United States money ?

2. How many score are there in 20 ? in 200 ?

3. In what year was a man born, if he was fourscore years old in 1900 ?

4. A boy is 18 years old and his age is  $\frac{3}{7}$  the age of his father. How old is his father ?

5. What is the l. c. m. of 4, 12, 16 ? of 3, 6, 9 ? of 5, 10, 15, 20 ?

Rapidly reduce the following to common fractions :

.45; 3.25; .075; .625;  $.08\frac{1}{2}$ ; .35; .125; .0025; .0625;  $14\frac{3}{4}$ .

6. Forty boys are present, which is  $\frac{5}{6}$  of the number on register. How many boys are absent ?

7. A man having 96 bu. of corn, sells  $\frac{2}{3}$  of them. How many bushels has he left ?

8. How much do I have to pay for 48 books at the rate of  $12\frac{1}{2}$ ¢ each ?

9. What is the value in United States money of 2 books at 1 franc each?

10. If 4 apples cost 5¢, how many apples can be bought for 60¢?

**Written.**

1. How many lots each 25 ft. by 75 ft. can be cut from a plot 75 ft. by 125 ft.?

2. I had a plot of ground 200 ft. wide by 700 ft. long. I divided it into lots measuring 20 ft. by 50 ft., and sold each lot for \$120. How much did I receive for my plot?

3. A rectangular lot is 200 ft. long and 180 ft. wide. Find the perimeter.

4. The perimeter of a rectangular lot of land is 380 ft. If the lot is 40 ft. wide, how long is it?

5. Measure the blackboard and find the number of square yards it contains.

Estimate the number of square yards in the floor of the schoolroom, and then, by measuring, ascertain how correct your estimate is.

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6. I had a plot of ground 600 ft. long and 150 ft. wide which I bought for \$8000. I divided it up into lots 100 ft. by 25 ft. and sold each lot for \$450. How much did I gain?

7. Find how much it would cost to carpet the floor of your schoolroom with carpet a yard wide, costing \$.75 a yard.

8. A merchant bought 8 gross of pens at \$1.20 a gross, and sold them at 18¢ a dozen. How much did he gain?

9. If it takes 18 qt. of milk to yield 1 lb. of butter, how much butter may be made from 15 gal. of milk?

10. A man bought 180 bbl. of flour, and sold  $\frac{5}{8}$  of them at  $\$6\frac{1}{2}$  a barrel. How much did he receive for the flour he sold?

### XV

#### Oral.

Read the numerators and the denominators in each of the following fractions:

$\frac{87}{10000}$ ; .009; .709; .0809; .075;  $.07\frac{1}{2}$ ;  $.06\frac{1}{4}$ ; .7603;  $.087\frac{1}{2}$ ;  $.66\frac{2}{3}$ ; .1010; .5700; .00666; .000006.

Read in decimal form:

$\frac{6}{16}$ ;  $\frac{3}{40}$ ;  $\frac{5}{80}$ ;  $\frac{4}{25}$ ;  $\frac{15}{80}$ ;  $\frac{3}{20}$ ;  $\frac{27}{64}$ ;  $1\frac{3}{4}$ ;  $2\frac{7}{8}$ ;  $7\frac{1}{20}$ .

What is the chief coin of Germany called?

(A German **mark** is equal to \$.2385, or about 24¢.)

What English coin is almost the same value as a mark?  
About how many marks would equal \$1? About how many franc pieces would equal \$1?

1. A pair of cassimere stockings is worth in German money 3 marks. About how much is that in United States money? in English money? in French money?

2. If  $8\frac{1}{2}$  yd. of material is required for a dress, how many dresses can be made from 34 yd.?

3. When milk is selling at 9¢ a quart, what is the value of a pint? What is the value of a gallon?

4. At 18¢ a quart for sirup, what is the cost of 2 qt. and 1 pt.?

5. A 40-qt. can contains 35 qt. of milk. What part of the can is full?

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At sight add :

9	5	7	2	9	8	8	9	5	6	32	7	15	9	17
10	9	25	31	7	15	8	17	4	7	3	33	22	6	12
18	13	7	4	16	3	28	10	25	21	8	5	3	38	32

Read :

.0006; .000006; .00705; 45.3007; .000436; .0800083;  
.0008006.

Read in lowest decimal terms :

$\frac{800}{1000}$ ; .700; .0640; .00400; .12500; .10600; .800.

6. At 4¢ a pint, how much will 4 qt. of milk cost?
7. I bought tea for  $\$ \frac{1}{2}$  and coffee for  $\$ \frac{1}{4}$ . How much change should I get from a 5-dollar gold piece?
8. What is the perimeter in feet of an equilateral triangle that measures 18 in. on a side?
9. What is the length of one side of a square that contains 64 sq. in.?
10. How long is a rectangle that is 18 ft. wide and contains 40 sq. yd.?

Written.

1.  $100.063 + .097 + .09037 + 80.00307 + 30.7093 + .000063 = ?$
2. Add .375, 90.07, 2940083, .00017, and 6.5.
3. From 1010 and 101 millionths take 4 and 89 ten-thousandths.
4. From the sum of 73.5 and .97 take their difference.
5.  $2.0009 - 1.904, + 26.7, + 45.973 = ?$
6. Add the sum of 40 and 4 hundredths and 57 and 97 thousandths to their difference.

7. From one hundred and one hundredth, take ninety and nine hundred nine ten-thousandths.

8. Mr. James sold  $\frac{1}{5}$  of his farm for \$906.075. At this rate what was the value of the whole farm?

9. How much will 8 gal. 2 qt. of molasses cost at 85¢ a gallon? 18 gal. 1 pt. at 48¢ a gallon?

10. Find the cost of  $8\frac{3}{4}$  cwt. of meat at 6¢ a pound.

## XVI

Oral.

Rapidly add :

4	6	28	4	8	14	7	8	42	6	5	8	32	8	3
7	15	5	9	14	2	9	31	3	24	7	40	9	2	36
23	9	8	12	6	8	20	9	5	7	34	6	4	29	7

How many times is  $\frac{3}{4}$  contained in 1? How many times is  $\frac{5}{8}$  contained in 1?  $\frac{7}{8}$  in 1?

$1 + \frac{4}{5} = ?$   $4 + \frac{4}{5} = ?$   $8 + \frac{4}{5} = ?$   $12 + \frac{3}{4} = ?$   $1 + \frac{7}{8} = ?$   $16 + \frac{3}{8} = ?$

1. If  $\frac{5}{8}$  of a pound of prunes costs 10¢, how much will  $\frac{3}{4}$  of a pound cost?

2. At 5¢ a score, how much will 60 clothespins cost?

3. If  $\frac{3}{4}$  of a farm is worth \$2400, how much is  $\frac{3}{8}$  of it worth?

4. Robert is 12 yr. old;  $\frac{3}{8}$  of Robert's age is  $\frac{3}{8}$  of Henry's age. How old is Henry?

5.  $\frac{3}{4}$  of 20 =  $\frac{5}{8}$  of what number?

Rapidly subtract :

34	35	28	33	32	27	28	32	30	54	43	38	52	40	36
29	26	19	26	25	18	17	8	22	45	37	29	49	31	27

6. I sold a cow for \$32, which was  $\frac{4}{5}$  of what it cost me. How much did it cost me?
7. How many barrels of flour at \$6 $\frac{1}{2}$  a barrel are worth 25 bbl. of apples at \$3 a barrel?
8.  $28 = \frac{4}{7}$  of what number?  $\frac{8}{9}$  is  $\frac{4}{5}$  of what number?
9. If  $\frac{3}{4}$  of a yard cost \$ $\frac{3}{5}$ , how much will  $\frac{5}{8}$  of a yard cost?
10. If 16 men can earn \$32, how much can 64 men earn?

**Written.**

1. I bought 288 bbl. of flour for \$1482, and sold it for \$2058. What was the gain on each barrel?
  2. How many pounds of tea at \$1 $\frac{1}{4}$  a pound can be bought for \$6 $\frac{1}{4}$ ?
  3. Divide 56 by  $1\frac{5}{8}$ ;  $\frac{3}{4}$  by 18;  $\frac{3}{10}$  by  $\frac{1}{2}$ ;  $16\frac{1}{2}$  by  $13\frac{1}{5}$ .
  4. Divide  $\frac{4}{5}$  of  $\frac{5}{8}$  by  $\frac{7}{10}$ ;  $12\frac{2}{10}$  by  $\frac{1}{3}$  of  $6\frac{3}{4}$ .
  5.  $\frac{1}{15} + 7 \times \frac{2}{3}$  of  $1\frac{1}{2} = ?$
- 
6. How much will  $\frac{3}{4}$  of  $5\frac{1}{2}$  T. of hay cost at \$15 $\frac{3}{10}$  a ton?
  7. How much will 56 lb. of cotton cost at 18 $\frac{3}{4}$ ¢ a pound?
  8. A farmer sold 16 cd. of wood at \$3 a cord; and 40 bu. of wheat at \$2 a bushel. He received 15 yd. of cloth at \$4 a yard, and the remainder in money. How much money did he receive?
  9. Find the cost of 16 reams of paper at 20¢ a quire.
  10.  $(\frac{2}{5}$  of  $8\frac{1}{3} - 3 \times \frac{3}{10}) \times (\frac{7}{8} + \frac{1}{3} + 5\frac{7}{8}) = ?$

**XVII****Oral.**

Rapidly give the products :

$9 \times 4$ ;  $8 \times 9$ ;  $10 \times 5$ ;  $18 \times 5$ ;  $26 \times 5$ ;  $10 \times 7$ ;  $6 \times 8$ ;  
 $6 \times 6$ ;  $27 \times 5$ ;  $13 \times 4$ ;  $16 \times 4$ ;  $18 \times 3$ ;  $25 \times 3$ ;  $18 \times 4$ .

Rapidly give the quotients :

$54 \div 9$ ;  $36 \div 6$ ;  $54 \div 6$ ;  $45 \div 9$ ;  $48 \div 3$ ;  $56 \div 10$ ;  
 $42 \div 7$ ;  $21 \div 3$ ;  $28 \div 7$ ;  $42 \div 6$ ;  $48 \div 8$ ;  $72 \div 20$ .

In dividing by a fraction why do you invert the divisor and then multiply by it? (Explain  $\frac{3}{4} \div \frac{2}{3} = \frac{3}{4} \times \frac{3}{2} = \frac{9}{8} = 1\frac{1}{8}$ .)

1. Divide  $\frac{7}{8}$  by  $\frac{3}{4}$ ;  $\frac{4}{5}$  by  $\frac{2}{3}$ ;  $\frac{5}{6}$  by  $\frac{1}{2}$ ;  $\frac{1}{2}$  by  $\frac{3}{4}$ .
2. Reduce  $\frac{3}{4}$  of a bushel to quarts.
3. How many pints are there in 2 gal. 3 qt.?
4. How many gallons of milk does a 40-qt. can hold?
5. How many reams would 480 quires of paper make?

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Rapidly give the products :

$17 \times 10$ ;  $35 \times 100$ ;  $26 \times 20$ ;  $56 \times 200$ ;  $138 \times 10$ ;  $875 \times 100$ ;  
 $85 \times 10$ ;  $87 \times 100$ ;  $35 \times 20$ ;  $24 \times 200$ ;  $527 \times 10$ ;  $456 \times 100$ .

Rapidly give the quotients :

$27 \div 10$ ;  $420 \div 100$ ;  $26 \div 20$ ;  $56 \div 200$ ;  $124 \div 10$ ;  $124 \div 100$ ;  
 $35 \div 10$ ;  $560 \div 100$ ;  $36 \div 20$ ;  $24 \div 200$ ;  $356 \div 10$ ;  $356 \div 100$ .

6.  $\frac{5}{6} \div \frac{4}{5} = ?$   $12 \div \frac{2}{3} = ?$   $\frac{5}{6} \div \frac{3}{4} = ?$   $2\frac{1}{2} \div \frac{5}{6} = ?$  (Explain the process of division in one of the examples.)

7. If tea is  $\$ \frac{4}{5}$  a pound, how many pounds can be bought for \$1? for \$120?



8. If  $\frac{1}{2}$  of a yard of merino costs 18¢, how much will  $1\frac{1}{2}$  yd. cost?

9. If 6 sheets of paper cost 5¢, how much will 3 quires cost?

10. If 3 men can do a piece of work in  $9\frac{1}{2}$  da., how long at the same rate will it take 1 man to do it? How long will it take 9 men to do it?

**Written.**

1. Twenty-seven is what part of 243? of 900? of 1728?

2. 450 lb. is what part of a ton?

3. If 120 bu. of fruit were spoiled in transit and this number was  $\frac{3}{4}$  of the entire load, how many bushels were there in the load?

4. Put in proper bill form, showing who is the debtor, and receipt for payment.

John Hitchcock bought of Herbert Wiley, Jan. 9, 1909, 1 horse at \$195, 2 cows at \$50, 1 wagon at \$62, 2 shovels at \$1.12, 30 bu. of corn at 65¢, and 28 bu. of wheat at 98¢.

5. When should a bill be receipted? Why is it a good plan to keep receipted bills? What is meant by the term debtor? What is meant by the term creditor?

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6. 27 qt. 1 pt. is what part of 5 bu.?

7. Make out and properly receipt the bill for five different articles bought from a grocer.

8. Find the number of quarts in 4 bu. 3 pk. 5 qt.

9. Find the number of gills in 5 gal. 3 qt. 1 pt.

10. What is the value of a house lot 100 ft. square at 40¢ a square foot?

**XVIII****Oral.****Rapidly answer :**

$$\begin{array}{l}
1\frac{1}{2} + \frac{1}{2} = ? \quad 1\frac{1}{2} - \frac{1}{2} = ? \quad 1\frac{1}{2} \times \frac{1}{2} = ? \quad 1\frac{1}{2} \div \frac{1}{2} = ? \quad 1\frac{1}{2} + 2 = ? \\
1\frac{1}{2} + \frac{1}{4} = ? \quad 1\frac{1}{2} - \frac{1}{4} = ? \quad 1\frac{1}{2} \times \frac{1}{4} = ? \quad 1\frac{1}{2} \div \frac{1}{4} = ? \quad 1\frac{1}{2} + 4 = ? \\
1\frac{1}{2} + \frac{1}{3} = ? \quad 1\frac{1}{2} - \frac{1}{3} = ? \quad 1\frac{1}{2} \times \frac{1}{3} = ? \quad 1\frac{1}{2} \div \frac{1}{3} = ? \quad 1\frac{1}{2} + 3 = ? \\
1\frac{1}{2} + \frac{1}{6} = ? \quad 1\frac{1}{2} - \frac{1}{6} = ? \quad 1\frac{1}{2} \times \frac{1}{6} = ? \quad 1\frac{1}{2} \div \frac{1}{6} = ? \quad 1\frac{1}{2} + 6 = ?
\end{array}$$

1. How many dozens are there in 186 oranges ?
2. How much will 6 quires of paper cost at \$4 a ream ?
3. If paper is bought at \$2 a ream and sold at 18¢ a quire, what is the gain on 6 reams ?
4. A bushel of apples at \$.75 a peck will cost how much ?
5. A quart of milk was taken from a full five-gallon can. What part of the can remained full ?

**Rapidly answer :**

$$\begin{array}{l}
1\frac{1}{3} + \frac{1}{3} = ? \quad 1\frac{1}{3} - \frac{1}{3} = ? \quad 1\frac{1}{3} \times \frac{1}{3} = ? \quad 1\frac{1}{3} \div \frac{1}{3} = ? \quad 1\frac{1}{3} + 2 = ? \\
1\frac{1}{3} + \frac{1}{4} = ? \quad 1\frac{1}{3} - \frac{1}{4} = ? \quad 1\frac{1}{3} \times \frac{1}{4} = ? \quad 1\frac{1}{3} \div \frac{1}{4} = ? \quad 1\frac{1}{3} + 4 = ? \\
1\frac{1}{3} + \frac{1}{3} = ? \quad 1\frac{1}{3} - \frac{1}{3} = ? \quad 1\frac{1}{3} \times \frac{1}{3} = ? \quad 1\frac{1}{3} \div \frac{1}{3} = ? \quad 1\frac{1}{3} + 3 = ? \\
1\frac{1}{3} + \frac{1}{6} = ? \quad 1\frac{1}{3} - \frac{1}{6} = ? \quad 1\frac{1}{3} \times \frac{1}{6} = ? \quad 1\frac{1}{3} \div \frac{1}{6} = ? \quad 1\frac{1}{3} + 6 = ?
\end{array}$$

6. Reduce  $9\frac{2}{3}$  to an improper fraction and explain how to reduce a mixed number to an improper fraction.
7. How many fourths are there in  $8\frac{3}{4}$  ? (Explain this.)
8. A woman had  $5\frac{1}{4}$  lb. of sugar and used  $\frac{2}{7}$  of it. How many pounds did she use ?
9. Victoria bought  $10\frac{3}{8}$  yd. of ribbon at 16¢ a yard. How much did she pay for it ?

10. How many strips of carpet  $4\frac{1}{2}$  yd. long can be cut from a roll of carpet containing 64 yd.?

**Written.**

1. Reduce  $\frac{126}{315}$  to its lowest terms by means of the g. c. d.

2. Reduce  $\frac{1}{2}$ ,  $\frac{9}{10}$ ,  $\frac{4}{5}$ ,  $\frac{2}{3}$  to fractions having the l. c. d.

3. Add  $\frac{2}{3}$ ,  $\frac{3}{8}$ ,  $\frac{5}{6}$ , and  $\frac{3}{4}$ .

4.  $86\frac{9}{10} - (50\frac{1}{8} + \frac{1}{4}) = ?$

5. A man's family expenses are \$2465 $\frac{1}{2}$  a year, which is  $\frac{2}{3}$  of his income. How much does he save?

6. Reduce  $2\frac{3}{4} \times \frac{2}{125}$  to a decimal.

7.  $\frac{3}{7}$  of  $1\frac{2}{3} \times \frac{5}{6}$  of  $\frac{9}{12}$  of 4 = ?

8. I bought 40 bu. of grain at the rate of  $3\frac{1}{2}$  bu. for \$3.20. How much did I pay for the grain?

9. Find the cost of  $8\frac{1}{2}$  yd., if  $5\frac{2}{3}$  yd. cost \$2.75.

10. Subtract  $\frac{1}{3}$  of  $\frac{9}{10}$  from  $8\frac{2}{3} + (2\frac{1}{4} + 4\frac{1}{5})$ .

**XIX**

**Oral.**

Rapidly find :

$.12\frac{1}{2}$ of	$\left\{ \begin{array}{l} 24 \\ 64 \\ 48 \\ 72 \\ 80 \\ 56 \\ 40 \\ 32 \end{array} \right.$	$.06\frac{1}{4}$ of	$\left\{ \begin{array}{l} 32 \\ 64 \\ 48 \\ 80 \\ 144 \\ 160 \\ 128 \\ 640 \end{array} \right.$	$.08\frac{1}{3}$ of	$\left\{ \begin{array}{l} 36 \\ 72 \\ 24 \\ 60 \\ 84 \\ 108 \\ 144 \\ 240 \end{array} \right.$	$.14\frac{2}{7}$ of	$\left\{ \begin{array}{l} 28 \\ 14 \\ 56 \\ 35 \\ 42 \\ 98 \\ 84 \\ 49 \end{array} \right.$
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Rapidly multiply each of the following numbers by 5 :

27; 35; 25; 16; 84; 138; 240; 720; 64; 38.

1. Reduce .000600 to its lowest decimal terms.

2. Read  $\frac{7}{10}$ ;  $\frac{17}{100}$ ;  $\frac{170}{1000}$ ;  $\frac{1700}{10000}$ ; 0.6; .16; .160; .175; 2.8; .705; .023; .003; 7.05; 0.23; 6.306; 42.0094.

3. Reduce  $\frac{4}{5}$  and  $\frac{17}{20}$  to decimals.

4. What is the sum of 7 E., 7 d., 7 m. in dollars and cents?

5. Add  $\frac{1}{12}$  and .003.

Rapidly find :

$.37\frac{1}{2}$ of	16	$.62\frac{1}{2}$ of	32	$.41\frac{2}{3}$ of	36	$.28\frac{4}{7}$ of	28
	24		64		72		14
	72		48		24		56
	32		80		60		35
	40		144		84		42
	48		160		108		98
	96		128		144		84
	56		640		240		49

6. Reduce 2.45 to a common fraction.

7. Reduce  $3\frac{3}{8}$  to a pure decimal.

8. If  $2\frac{1}{4}$  yd. of silk cost  $\$3\frac{3}{8}$ , what is the price of 1 yd.? How much will  $\frac{5}{8}$  of a yard cost?

9. What part of 12 is  $\frac{1}{2}$ ? of 8 is  $\frac{1}{4}$ ? of 12 is  $\frac{1}{3}$ ?

10. In 2.6 how many hundred-thousandths are there?

Written.

1. Write in decimal form : 709 hundredths; 25 ten-thousandths; 500 and 25 thousandths; 3007 ten-thousandths; 709 ten-thousandths.

2. How many times are  $3\frac{1}{5}$  gal. contained in  $6\frac{2}{3} \times 36$  gal.?

3. Reduce  $\frac{1}{8}$  to ten-thousandths;  $\frac{1}{200}$  to a decimal.

4. Reduce 12.725 to a common fraction; to a mixed number.

5. I paid  $\$1837\frac{1}{2}$  for 3675 bu. of oats. What was the cost per bushel?

6. A young man's salary is  $\$1200$  a year. He spends  $.12\frac{1}{2}$  of it for clothes, and  $\$10$  a week for other expenses. How much does he save during the year?

7. What is the value of  $(\frac{2}{3}$  of  $\frac{5}{8}$  of  $3\frac{3}{4} + 8\frac{2}{3}) + (10\frac{1}{2} - 7\frac{5}{12})$ ?

8. Mr. Gould sold a cow for  $\$30$ , which was  $\frac{3}{5}$  of what it cost him. How much did he lose?

9. If  $2\frac{3}{4}$  A. of land cost  $\$220$ , what will be the cost of  $17\frac{7}{8}$  A.?

10. A man bought land for  $\$5130$  and sold it to gain  $\frac{1}{9}$  of the cost. The gain being  $\$3$  an acre, how many acres did he buy?

## XX

### Oral.

Rapidly give change from  $\$1$ :

On sales of 85¢; 42¢; 36¢; 79¢; 28¢; 15¢; 56¢; 27¢; 15¢; 32¢; 17¢; 54¢.

1. Find the cost of 25 readers at the rate of  $16\frac{2}{3}$ ¢ a-piece, and 24 at the rate of  $33\frac{1}{3}$ ¢ each.

2.  $\frac{1}{4}$  is what part of  $\frac{1}{2}$ ?  $\frac{1}{4}$  is what decimal part of  $\frac{1}{2}$ ?

3. If  $2\frac{1}{4}$  yd. can be bought for  $\$1\frac{1}{5}$ , how many yards can be bought for 80¢?

4. What part of a pound sterling is 5*d.*?
5. What decimal part of a gallon is 4 gi.?

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Rapidly add, then subtract:

5.6	3.4	6.8	8.2	.35	.29	.45	5.7	6.4	.39	8.7	.43
<u>4.2</u>	<u>2.8</u>	<u>1.3</u>	<u>2.5</u>	<u>.17</u>	<u>.18</u>	<u>.19</u>	<u>2.7</u>	<u>2.9</u>	<u>.15</u>	<u>5.8</u>	<u>.28</u>

6. When apples sell at 20 ¢ a peck, how much are they worth a bushel?
7. If a farmer sells a bushel of currants at 10 ¢ a quart, how much does he receive for them after paying 3 ¢ a quart for the picking of them?
8. How much is gained on 40 gal. of molasses bought for \$30 and sold at 30 ¢ a quart?
9. If a quart of nuts costs 8 ¢, how many bushels can be bought for \$3.20?
10. What decimal part of 36 is 9?

**Written.**

1. A man is 63 yr. old. What part of his age is the age of his son, who is 36 yr. old?
  2. If 36 yd. of dress cloth cost \$42.12, how much will 15 yd. cost?
  3. A dealer sold 287 sheep, which was  $\frac{7}{8}$  of his flock. How many sheep had he in his flock?
  4. There are 44 boys on register and 36 in attendance. What decimal part of the class is absent?
  5. Find the l. c. m. of 3, 9, 7, 14, 6, 2, and 12.
-

6. I sold a lot for \$1500, which was  $\frac{5}{8}$  of its cost. How much did it cost me? How much did I gain or lose?

7. A man gave his son \$225, which was  $\frac{2}{3}\frac{5}{2}$  of the amount that he gave to his two daughters. How much did each daughter receive?

8. A contractor who was supposed to finish his work in 3 mo. completed it in 75 da. In what part of the required time did he finish it?

9. A horse traveled  $48\frac{2}{10}$  mi. the first day,  $56\frac{3}{4}$  mi. the second,  $40\frac{1}{3}\frac{2}{3}$  the third, and  $45\frac{2}{4}\frac{7}{6}$  the fourth day. How many miles did it travel in the four days?

10. A merchant sold 4 pieces of cloth containing  $27\frac{1}{2}$  yd.,  $26\frac{2}{3}$  yd.,  $29\frac{5}{8}$  yd., and  $28\frac{1}{4}$  yd., respectively. How much did he receive for the cloth at 96¢ per yard?

## SECOND MONTH

**RAPID DRILLS** — daily.

**READING AND WRITING NUMBERS** — continued.

**THE FUNDAMENTAL OPERATIONS** — to secure quickness and accuracy.

**COMMON FRACTIONS** — reviewed. Compound fractions; complex fractions.

**DECIMAL FRACTIONS.** Reduction, addition, subtraction, multiplication of more than three orders.

**DENOMINATE NUMBERS.** Reduction, addition, subtraction.

**MEASUREMENTS.** Areas of rectangles and of parallelograms using base and altitude.

**TABLES.** Avoirdupois weight and review.

**PROBLEMS.** To cover the work of the month in common and decimal fractions and three of the type problems. Finding what decimal part one number is of another.

### XXI

**Oral.**

Rapidly give the products :

75 $\times 5$	86 $\times 5$	15 $\times .5$	18 $\times \frac{1}{2}$	18 $\times 1\frac{1}{2}$	18 $\times 1\frac{1}{3}$	17 $\times 5$
36 $\times 5$	16 $\times 1\frac{1}{4}$	24 $\times 1\frac{1}{2}$	20 $\times .5$	20 $\times 1.5$	26 $\times \frac{1}{2}$	26 $\times 1\frac{1}{2}$

Tell how to multiply a number by 5 in the shortest way.  
Count to 2 by  $\frac{1}{4}$ 's. Count to 2 by  $\frac{1}{3}$ 's.



What is  $\frac{1}{4}$  of 100? Multiply 20 by 100 and divide the product by 4.

Multiply 20 by 25. Multiplying a number by 100 and then dividing the product by 4 is the same as multiplying a number by what number? Why?

1. Add 2 ciphers to each of the following numbers and then divide them by 4: 16; 24; 48; 36; 72; 12; 28; 32; 40; 60; 10; 100; 30; 44.

2. Multiply the following numbers by 25: 16; 24; 8; 28; 20; 36; 44; 25; 32; 80; 160; 120; 320; 56.

3. What is the cost of 100 lb. of butter at 32¢ a pound? What is the cost of  $\frac{1}{4}$  as many pounds, or of 25 lb.?

4. If one trunk costs \$5.60, how much will 25 trunks cost at the same rate?

5. At  $6\frac{1}{2}$  dimes a bushel, how much will 15 bu. of wheat cost?

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Rapidly give the products:

17	7	5	16	16	18	75
$\times 25$	$\times 25$	$\times 25$	$\times \frac{1}{2}$	$\times 1\frac{1}{2}$	$\times 1.5$	$\times 25$
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
21	90	90	32	36	28	28
$\times 25$	$\times 5$	$\times 1\frac{1}{2}$	$\times 1\frac{1}{2}$	$\times 1\frac{1}{2}$	$\times 1.5$	$\times 5$
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

Count by  $\frac{1}{6}$ 's to 1. Count by  $\frac{1}{6}$ 's to 1.

6. How much will 16 yd. of ribbon cost at 25¢ a yard?

7. Find the price of 25 chairs at \$6 each?

8. How much will 7 bbl. of apples cost at the rate of \$9 for  $2\frac{1}{4}$  bbl.?

9. Mary gave away 20 roses, which is  $\frac{2}{3}$  of as many as she then had. How many had she then? How many had she at first?

10. If  $2\frac{1}{8}$  yd. of tape cost 13¢, how much will 3 yd. cost?

**Written.**

1. Multiply by 25 : \$16.80 ; \$62.25 ; 144 ; \$25.25.

2. If a sheep consumes about 400 lb. of hay in a year, how many tons of hay will be needed to feed a flock of 25 sheep for a year?

3. Find by inspection the l. c. m. of 3, 6, 9, 12, 18, 36, and 48.

4. Find the g. c. d. of 36 and 63 ; of 36, 63, and 108.

5. To the sum of  $7\frac{7}{8}$  and  $18\frac{3}{8}$ , add the difference between these numbers.

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6. Find the cost of 25 dictionaries at \$14.50 apiece.

7. A man who owned  $\frac{4}{5}$  of  $26\frac{3}{4}$  A. of land, sold  $\frac{3}{4}$  of what he owned. How many acres did he have left?

8. 32 is what part of 96? how many hundredths of 96?

9. A farmer raised 144 bu. of buckwheat and sold 108 bu. What part of his original number of bushels had he left? What decimal part had he left?

10. \$41 $\frac{3}{8}$  equals  $\frac{5}{7}$  of the cost of a watch. What is the cost of the watch?

## XXII

## Oral.

Rapidly divide the numerator by the denominator in these fractions:  $\frac{78}{26}$ ;  $\frac{840}{40}$ ;  $\frac{3600}{30}$ ;  $\frac{2800}{14}$ ;  $\frac{2800}{1400}$ ;  $\frac{390}{130}$ ;  $\frac{880}{22}$ ;  $\frac{960}{32}$ ;  $\frac{690}{30}$ ;  $\frac{36000}{600}$ ;  $\frac{72000}{600}$ ;  $\frac{3200}{1300}$ ;  $\frac{690}{30}$ ;  $\frac{4800}{4}$ ;  $\frac{1421}{203}$ ;  $\frac{840}{210}$ ;  $\frac{46000}{90}$ ;  $\frac{2185}{305}$ .

Read  $\frac{7}{8}$ . Read it as an example in division. Which number is the dividend? Which is the divisor? What corresponds to the sign of division?

Read the following as examples in division:

$$\frac{3}{4}; \frac{3\frac{1}{2}}{4}; \frac{3\frac{1}{2}}{\frac{1}{2}}; \frac{3\frac{1}{2}}{4\frac{1}{2}}; \frac{6}{7}; \frac{6\frac{1}{2}}{7}; \frac{6\frac{1}{2}}{\frac{1}{2}}; \frac{6\frac{1}{2}}{7\frac{1}{2}}; \frac{5\frac{1}{2}}{6\frac{1}{2}}; \frac{2\frac{1}{2}}{3\frac{1}{2}}.$$

Expressions similar to  $\frac{3\frac{1}{2}}{4}$ ;  $\frac{3\frac{1}{2}}{\frac{1}{2}}$ ;  $\frac{3\frac{1}{2}}{3\frac{1}{2}}$ , etc., are called **complex fractions**. Of what does a complex fraction consist?

1. What is the value in a simple fraction of:

$$\frac{1}{6}; \frac{12}{4}; \frac{1\frac{1}{2}}{3}; \frac{4}{1\frac{1}{3}}; \frac{6}{1\frac{1}{2}}; \frac{9}{1\frac{1}{2}}; \frac{1}{\frac{1}{5}}; \frac{1}{\frac{6}{7}}; \frac{5}{\frac{6}{8}}; \frac{8}{1\frac{1}{3}}; \frac{6}{\frac{6}{7}}; \frac{4}{\frac{4}{5}}; \frac{1}{\frac{1}{5}}; \frac{1}{\frac{7}{8}}; \frac{7}{\frac{7}{8}}.$$

2. What part of  $\frac{3}{4}$  is 1? of  $\frac{5}{6}$  is 1? of  $\frac{7}{8}$  is 1? of  $\frac{4}{5}$  is 1?

3. What part of  $\frac{3}{4}$  is  $\frac{1}{4}$ ? of  $\frac{5}{6}$  is  $\frac{1}{6}$ ? of  $\frac{7}{8}$  is  $\frac{1}{8}$ ? of  $\frac{4}{5}$  is  $\frac{1}{5}$ ?

4. What part of  $\frac{1}{2}$  is  $\frac{1}{4}$ ? of  $\frac{1}{4}$  is  $\frac{1}{2}$ ? of  $\frac{1}{3}$  is  $\frac{1}{2}$ ? of  $\frac{1}{2}$  is  $\frac{1}{3}$ ?

5. Mrs. Simpson is 27 years old and her age is  $\frac{3}{4}$  of her husband's age. How old is her husband?

Rapidly divide the numerator by the denominator:

$$\frac{45000}{9}; \frac{48000}{8000}; \frac{1624}{8}; \frac{1}{7\frac{1}{2}}; \frac{1}{6\frac{2}{3}}; \frac{3}{\frac{4}{3}}; \frac{4}{\frac{5}{6}}; \frac{1206}{6}; \frac{880}{220}; \frac{880}{20}; \frac{49000}{7000}; \frac{7\frac{1}{2}}{1\frac{1}{2}}; \frac{3}{\frac{3}{4}}; \frac{1}{\frac{8}{9}}; \frac{8}{\frac{8}{9}}; \frac{62\frac{1}{2}}{100}; \frac{37\frac{1}{2}}{100}.$$

6. At  $\$ \frac{3}{4}$  per yard, how much silk will \$1 buy?
7. At  $\$ \frac{1}{4}$  each, how many baseballs can I buy for \$12?
8. What part of  $\frac{3}{8}$  is 1? Explain the division of 1 by  $\frac{3}{8}$ ; of 16 by  $\frac{3}{8}$ ; of  $\frac{4}{5}$  by  $\frac{3}{8}$ .
9. What part of  $\frac{3}{4}$  is 1? of  $\frac{3}{4}$  is  $\frac{3}{8}$ ?
10. At 10¢ a yard, how many yards of muslin can I buy for 85¢?

**Written.**

1. Write each of the following questions in the form of a fraction :

- (a) What part of 108 is 96?
- (b) 84 is what part of 144?
- (c) What part of 72 is  $6\frac{1}{2}$ ?
- (d)  $7\frac{3}{8}$  is what part of 46?
- (e)  $5\frac{1}{8}$  is what part of 8?

2. What part of  $16\frac{1}{2}$  is  $5\frac{1}{2}$ ? In this example what is the divisor? Reduce the answer to the example to a decimal.

3. What decimal part of  $\frac{8}{9}$  is  $\frac{4}{9}$ ?

4. Simplify  $\frac{8}{16\frac{3}{4}}$ ;  $\frac{3\frac{1}{2} \times 15}{25 \times 7\frac{5}{8}}$ .

5. The dues paid by the members of a club are \$2500 a year; this is  $\frac{20}{33}$  of the whole expenses. What are the expenses?
- 

6. Write  $12 + 9\frac{5}{8}$  as a complex fraction and reduce it to a simple fraction.

7. Simplify  $\frac{7\frac{3}{4}}{20\frac{3}{8}}$ .

8. Simplify  $\frac{80 \times 16\frac{7}{8}}{2\frac{2}{5} \times 16}$ .

9. 48 is what decimal part of 196?

10. 63 is  $\frac{5}{8}$  of what number?

## XXIII

Oral.

Rapidly add:

75	63	85	77	93	76	82	67	57	96	83	94	88	67	75
56	48	37	24	87	76	49	65	48	44	39	27	28	36	47

When one or both terms of a fraction contain a fraction, what is such a fraction called?

Explain how to simplify a complex fraction.

1. Simplify:  $\frac{\frac{6}{8}}{\frac{3}{4}}$ ;  $\frac{\frac{2}{3}}{\frac{4}{5}}$ ;  $\frac{12}{\frac{3}{4}}$ .

2. I bought a watch for \$48. Find the value of 25 watches at this rate.

3. How much will 5 bu. of currants cost at  $12\frac{1}{2}$ ¢ a quart?

4. A franc is worth 19.3¢ in our money. How much are 5 francs worth?

5. Find the cost of 480 yd. of dress goods at  $37\frac{1}{2}$ ¢ a yard.

Rapidly add:

66	38	46	53	68	56	45	39	29	48	49	59	65	53	46
24	35	27	33	24	37	28	37	29	36	47	36	28	37	44

What is a compound fraction? What is a complex fraction?

6. Simplify:  $\frac{3}{4}$  of  $\frac{8}{9}$ ;  $\frac{5}{8}$  of  $\frac{2}{3}$ ;  $\frac{1}{2}$  of  $\frac{2}{3}$  of  $\frac{3}{4}$ ;  $\frac{4}{5}$  of  $\frac{7}{8}$ .

7. Find the value of:  $\frac{1}{2}$ ;  $\frac{3}{4}$ ;  $\frac{8}{\frac{1}{4}}$ ;  $\frac{2\frac{1}{2}}{\frac{3}{4}}$ .

8. At the rate of \$25 each, what will be the cost of 44 cows?

9. How much will 17 books cost at 25¢ each?

10. A boy divides a foot of wire into pieces  $\frac{3}{4}$  in. long. How many pieces does he make?

Written.

1. Add: 408675

73409

180617

2956

374

48493

390078

58994

3487

867

90716

4874

49856

2. Find the sum of  $\frac{13}{25}$ ,  $\frac{51}{85}$ ,  $\frac{24}{25}$ , and  $\frac{1}{2}$ .

3. A man who had spent \$9 $\frac{1}{2}$  for a coat, and \$2 $\frac{3}{4}$  for a vest, had \$6 $\frac{1}{2}$  remaining. How much had he at first?

4. Add 52 $\frac{7}{10}$ , 240, 34 $\frac{2}{10000}$ , 12 $\frac{1557}{100000}$ , and 3 $\frac{87}{100000}$ .

5. Find the sum of 23.04, 8.6796, .0005, 7.00019, 8 $\frac{222}{1000}$ , and  $\frac{3}{25}$ .

6. Add: 8039

18647

108

3089

5423

46837

326974

78632

91775

420684

196537

15828

45080

124379

7. Find the value of

$$\frac{1}{7} + \frac{3}{4} + \frac{5}{8} + \frac{9}{14}.$$

8. A man having \$25 $\frac{1}{2}$ , paid \$6 $\frac{1}{2}$  for coal, \$2 $\frac{1}{5}$  for wood, and \$ $\frac{3}{4}$  for a pound of tea. How much money had he left?

9. Find the value of \$.87 $\frac{1}{2}$  + \$5 $\frac{3}{4}$  + \$86 + \$.388 + \$ $\frac{1}{8}$  + \$102.95.

10. How many rods of fence will inclose an irregular shaped field, the sides of which are respectively 34.72 rd., 48 $\frac{11}{16}$  rd., 152.17 rd., 95 $\frac{3}{8}$  rd., and 56 $\frac{5}{8}$  rd.?

**XXIV****Oral.**

Rapidly subtract :

131	193	163	186	171	132	181	161	153	172	135
<u>56</u>	<u>97</u>	<u>74</u>	<u>99</u>	<u>76</u>	<u>68</u>	<u>93</u>	<u>85</u>	<u>59</u>	<u>73</u>	<u>67</u>

1. Robert has 45 ¢ in three boxes ; in the first there are 15 ¢, in the second 19 ¢. How many cents are in the third box ?

2. A laborer dug  $\frac{1}{2}$  rd. of ditch the first hour,  $\frac{3}{4}$  rd. the second, and  $\frac{3}{8}$  rd. the third. How many rods did he dig in the three hours ?

3. Albert picked  $2\frac{1}{4}$  bu. of apples from 1 tree and  $3\frac{1}{2}$  bu. from another. How many bushels did he pick from both trees ?

4. Add .15 and .015.

5. A man earned  $3\frac{1}{2}$  E. and spent 3 d. How many dollars had he left ?

Rapidly subtract :

80	73	83	92	90	83	76	58	73	93	84	96	92	84	93
<u>24</u>	<u>46</u>	<u>28</u>	<u>24</u>	<u>33</u>	<u>45</u>	<u>39</u>	<u>29</u>	<u>35</u>	<u>37</u>	<u>48</u>	<u>49</u>	<u>68</u>	<u>36</u>	<u>65</u>

6. A grocer sold 15 lb. of butter at one time, 12 lb. at another, and 8 lb. at another. How many pounds did he sell in all ?

7. Four men bought a horse for \$80 ; the first gave \$25, the second \$20, and the third \$18. How much did the fourth give ?

8. What is the difference between 10 and .010 ?

- Written.**

- XXV

**Rapidly multiply :**

19	18	17	16	15	14	13	18	12	16	32	28	40	36	24
5	4	3	6	6	7	7	5	25	25	25	25	25	25	25



Find the value of:

$$\frac{1}{10} \times \frac{1}{10}; \frac{1}{10} \times \frac{1}{100}; \frac{1}{10} \times \frac{1}{1000}; \frac{1}{10} \times \frac{1}{10000}; \frac{1}{10} \times \frac{1}{100000}.$$

What does  $.1 \times .01$  equal? What does  $.01 \times .01$  equal?  $.01 \times .001 = ?$  In this example how many decimal places are there in the multiplicand? How many decimal places are there in the multiplier? How many decimal places are there in the product?

1. What does  $\frac{3}{8} \times \frac{4}{5}$  equal? Explain how you obtain the result.

2. In the decimal fraction .7 what is the numerator? the denominator? In the decimal fraction .07 what is the numerator? the denominator?

3. Multiply  $\frac{7}{10} \times \frac{7}{10}$ . Explain how you obtain the result.

4. Multiply:  $\frac{6}{10} \times \frac{6}{100}$ ;  $\frac{7}{100} \times \frac{6}{100}$ ; .9 by .8; .05 by .05.

5.  $.01 \times 1.01 = ?$   $.4 \times 1.6 = ?$   $.01 \times 2.1 = ?$   $.4 \times 16 = ?$

Rapidly multiply:

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20	40	40	30	30	30	60	60	60	14	14	14	48	48	48
<u>20</u>	<u>20</u>	<u>40</u>	<u>20</u>	<u>40</u>	<u>80</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>20</u>	<u>40</u>	<u>30</u>	<u>20</u>	<u>40</u>	<u>30</u>

6. Multiply  $\frac{5}{8}$  by  $\frac{3}{4}$ .

7. Multiply  $\frac{9}{10}$  by  $\frac{7}{1000}$ .

8. What is the cost of 4.5 yd. of cloth at \$.90 a yard?

9. If I pay \$4 for a yard of cloth, how much must I pay for .75 of a yard?

10. How much will 8 qt. of strawberries cost at  $12\frac{1}{2}$ ¢ a quart?

**Written.**

1. Find the product of 370607 multiplied by .4071; of 4800 by 750; of 86072 by .2085.
2. How much will 386 railway coaches cost at \$7034.75 each?
3. Multiply  $17\frac{2}{3}$  by 6; 27 by  $6\frac{4}{5}$ ;  $\frac{15}{21}$  by  $\frac{17}{25}$ ;  $37\frac{1}{2}$  by  $8\frac{3}{4}$ .
4. How much will  $7\frac{9}{10}$  T. cost at \$26 $\frac{1}{2}$  a ton?
5. When peaches are worth \$ $\frac{3}{4}$  a basket, how much are 26 $\frac{3}{4}$  baskets worth?

- 
6. At \$160 an acre, how much will 500 A. of land cost?
  7. Multiply 2340 by .65; by .505; by .3201.
  8. If a man buys 40 A. of land at \$35 an acre, and 56 A. at \$29 an acre, and sells the whole at \$32 an acre, how much does he gain or lose?
  9. How much will  $\frac{5}{8}$  yd. of satin cost at \$ $\frac{13}{20}$  a yard?
  10. What is the cost of  $\frac{4}{5}$  of  $6\frac{1}{2}$  T. of coal at  $\frac{3}{5}$  of \$7 $\frac{1}{4}$  per ton?

**XXVI**

**Oral.**

Rapidly answer:

- $1 + 25 = ?$     $1 + \frac{2}{3} = ?$     $8 + \frac{2}{3} = ?$     $\frac{8}{9} + \frac{2}{3} = ?$     $1 + 75 = ?$   
 $200 + 75 = ?$     $\frac{1}{2}$  of  $\frac{1}{2} = ?$     $\frac{1}{2}$  of  $\frac{2}{3} = ?$     $\frac{1}{2}$  of  $\frac{1}{4} = ?$     $\frac{1}{2}$  of  $\frac{3}{4} = ?$   
 $\frac{1}{2} + \frac{3}{4} = ?$     $\frac{1}{2} + \frac{1}{4} = ?$     $.5 \times .5 = ?$     $25 \times .5 = ?$     $.25 \times .5 = ?$
1. Reduce to improper fractions:  $2\frac{3}{4}$ ;  $5\frac{2}{3}$ ;  $6\frac{2}{3}$ ;  $4\frac{1}{6}$ .
  2. Read as improper fractions: 2.75; 5.32; 6.4; 4.2.
  3. Reduce to mixed numbers:  $\frac{16}{5}$ ;  $\frac{15}{2}$ ;  $\frac{19}{9}$ ;  $\frac{25}{3}$ .

4. Read as mixed numbers and tell what the numerator and the denominator of the fraction is: 6.45; 8.2534; 5.5; 16.785.

5. How much will a man earn in a week of 6 working days at the rate of  $\$2\frac{3}{4}$  a day?

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Rapidly answer:

$59 + 38 = ?$	$61 - 39 = ?$	$25 \times 25 = ?$	$3 \div \frac{3}{4} = ?$
$39 + 22 = ?$	$80 - 66 = ?$	$32 \times 25 = ?$	$\frac{3}{4} + 3 = ?$
$29 + 42 = ?$	$73 - 38 = ?$	$18 \times 4 = ?$	$1 + \frac{7}{8} = ?$
$54 + 26 = ?$	$93 - 56 = ?$	$17 \times 9 = ?$	$7 + \frac{7}{8} = ?$
$22 + 69 = ?$	$76 - 37 = ?$	$16 \times 8 = ?$	$6\frac{3}{4} \div 3 = ?$

6. How far can Harry walk in 5 hr., if he can walk  $6\frac{2}{5}$  mi. in 2 hr.?

7. How many eighths are there in  $8\frac{5}{8}$ ?

8. Reduce to mixed numbers:  $\frac{14}{8}$ ;  $\frac{15}{4}$ ;  $\frac{12}{7}$ ;  $\frac{23}{6}$ .

9. John found 60¢, which was  $\frac{5}{4}$  of  $\frac{1}{2}$  of what he then had. How much had he then? How much had he at first?

10. If 6 is  $\frac{2}{3}$  of a certain number, what is  $\frac{1}{3}$  of 3 times the same number?

**Written.**

1. Multiply 7.3 by 4.9. Tenths multiplied by tenths give how many decimal places in the product?

2. Multiply 46.73 by 1.9. Hundredths multiplied by tenths give how many decimal places in the product?

3. Multiply 10.08 by 8.06. Hundredths multiplied by hundredths give how many decimal places in the product?

4. Find the value of :  $7.4 \times 70.4$  ;  $946.09 \times 8.3$  ;  $84.63 \times 7.49$ .

5. Find the cost of 846.007 acres of land at \$42.05 an acre.

6. Find the product of : .5 of \$6.25 ; .22 of 3.84 ;  $\$3.60 \times .045$  ; .07 of \$12.03.

7. How much will 100 cd. of wood cost at \$4.38 a cord?

8. Find the cost of  $204\frac{7}{10}$  A. of land at \$72.75 an acre.

9. I bought 14.75 yd. of gingham at 14¢ a yard. What was the cost?

10. How much will 300 bu. of wheat cost at \$1.25 per bushel?

## XXVII

### Oral.

Rapidly add :

13	14	19	23	18	36	23	24	25	35	30	29	32	44	43
5	4	1	4	1	3	4	3	5	2	7	8	2	4	5
5	4	6	2	8	8	1	2	2	3	5	4	1	1	4

Multiplying thousandths by tenths gives how many decimal places in the product? Thousandths multiplied by hundredths = ? Thousandths multiplied by thousandths = ?

1. Find .05 of .005 ; .005 of .005.

2. In  $.07 \times .009$  read the numerator of each fraction ; read the denominator of each fraction ; read the numerator of the product ; read the denominator of the product.

3. How much will 10 lb. of sugar cost at  $\frac{4}{5}$  of a dime a pound?
4. What is .02 of 1.2?
5. What is  $.33\frac{1}{3}$  of 693 yd.?

Rapidly add :

43	45	47	45	48	49	54	56	57	58	39	28	67	64	69
6	4	4	5	5	9	7	6	6	8	4	3	4	3	3
5	1	8	3	3	3	2	3	4	4	4	6	4	3	9

6. If one boy earns 12¢ a day, another 15¢ a day, and another 20¢ a day, how much can the 3 boys earn in 5 da.?
7. How many are  $15 \times 12 + 20 \times 5$ ?
8. If an aeroplane moves  $3\frac{1}{7}$  mi. in 5 min., how far, at this rate, will it move in 20 min.?
9. What is  $\frac{1}{5}$  of  $\frac{1}{2}$ ?
10. What is .05 of .015?

**Written.**

1. How many cords of wood are there in 45 loads, allowing 8.25 cd. to a load?
2. How many pounds of coffee are there in 68 sacks, allowing 96.125 lb. to a sack?
3. Multiply  $.05\frac{1}{2}$  by 25.
4. Find  $.90\frac{1}{4}$  of 160.48.
5. Find .179 of \$92. \_\_\_\_\_
6. What is the cost of 3.4 lb. at 79¢ a pound?
7.  $.024 \times .15 = ?$

8. From  $.57\frac{1}{2}$  take  $.002\frac{1}{4}$ .
9.  $26000 \times 26$  thousandths = ?
10. From  $.43\frac{1}{2}$  take  $.005\frac{3}{4}$ .

## XXVIII

## Oral.

Rapidly add :

4	5	6	7	8	9	8	7	6	5	4	9	8	7	6	5	4	3	2	1
5	4	3	4	5	6	7	8	5	4	3	2	7	8	4	9	1	2	5	8
1	2	3	4	3	5	7	6	8	6	7	9	8	7	3	4	5	2	8	3
3	4	6	5	7	2	3	4	6	1	7	8	1	9	2	7	1	1	7	9
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

How many pounds equal a hundredweight? How many hundredweight equal a ton? How many pounds equal a ton? How many pounds equal a long ton? Mention some articles for which avoirdupois weight is used in weighing. How many ounces of sugar equal a pound of sugar? Eight ounces is what fractional part of a pound (avoirdupois)? Eight ounces is what decimal part of a pound (avoirdupois)?

1. One quart is what decimal part of a gallon?  $1\frac{1}{2}$  qt. is what decimal part of a gallon?
2. In 3 lb. 6 oz., how many ounces are there?
3. If a pound of butter costs 32¢, how much will .5 of a pound cost? 1.5 lb.?
4. How much will 9 eggs cost at 20¢ a dozen? at 32¢ a dozen?
5. How much will shoe tacks cost a dozen at the rate of \$2.88 a great gross? \_\_\_\_\_

Rapidly add:

1	2	3	4	5	6	7	8	9	8	7	6	5	4	3	2	1	7	5	6
9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	0
8	7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	9	8
7	6	5	4	3	2	1	0	9	8	7	6	5	4	3	2	1	0	9	8
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

6. How much will 2 cwt. of coffee cost at the rate of 4 lb. for 80¢?

7. Which is heavier, a pound of gold or a pound of lead? Why? Which is heavier, an ounce of silver or an ounce of feathers?

8. How many pints are there in 4 qt.?

9. A pint is what decimal part of 4 qt.?

10. An inch is what decimal part of a foot?

Written.

1. How much will 580.5 lb. cost at  $9\frac{1}{4}$ ¢ a pound?

2. Multiply  $\$506\frac{1}{8}$  by  $.048\frac{1}{2}$ .

3. Multiply .00101 by .001.

4. A train passes 15 telegraph poles every minute. If the distance between the poles is 30 yd., how many miles an hour is the train going?

5. How much will 14.16 rd. of wire cost at  $\$.02\frac{1}{2}$  a yard?

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6. From  $.075\frac{1}{8}$  take  $.00062\frac{1}{2}$ .

7. A merchant sold 86.75 T. of coal at \$7.25 a ton, thereby gaining \$112.12. What was the cost?

8. Find the value of  $3.126 \times .046 \times .3$ .

9.  $.002 \times 3.01 = ?$

10. What is the cost of 1684 lb. of beef at \$9.37½ per hundred pounds?

XXIX

Oral.

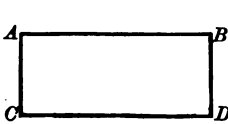
Rapidly answer :

$\frac{1}{4}$  of 32 = ?     $56 \div 4 = ?$      $.33\frac{1}{3}$  of 27 = ?     $700 + 800 = ?$   
 $\frac{3}{4}$  of 24 = ?     $72 \div 12 = ?$      $.16\frac{2}{3}$  of 72 = ?     $900 + 600 = ?$   
 $\frac{1}{2}$  of 64 = ?     $144 \div 4 = ?$      $.14\frac{2}{7}$  of 56 = ?     $600 + 800 = ?$   
 $\frac{1}{5}$  of 25 = ?     $132 \div 3 = ?$      $.08\frac{1}{8}$  of 36 = ?     $900 + 800 = ?$   
 $\frac{3}{8}$  of 80 = ?     $256 \div 10 = ?$      $.06\frac{1}{4}$  of 64 = ?     $500 + 700 = ?$

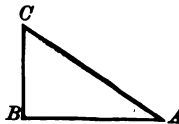
Count by 9's from 7 to 52; by 8's from 7 to 55; by fourths from 0 to 5; by thirds from 0 to 5.

Draw a square, a rectangle, a right-angled triangle.

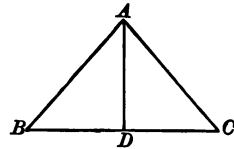
What name is given to the part upon which the figure usually rests? What name is given to the height of the figure? In the accompanying figures name by letters the base; name by letters the altitude.



(1)



(2)



(3)

In figure (1) what is the direction of the line  $AC$ , with respect to the line  $CD$ ?

In figure (2) what is the direction of the line  $BC$ , with respect to the line  $AB$ ?

In figure (3) what is the direction of the line  $AD$ , with respect to the line  $BC$ ?

What is the altitude of a triangle? of a rectangular figure? of any figure?



What is the distance around such a figure called? What is the surface covered by such a figure called? What is the perpendicular distance from the base to an opposite angle called?

1. How long is the perimeter of a 14-inch square?
2. How many yards of fringe are needed for a table cover 54 in. long and 36 in. wide?
3. What is the area of a 9-inch square?
4. A field 40 rd. long and 12 rd. wide contains how many square rods?
5. How many cubic feet are there in a room 12 ft. square and 10 ft. high?

Rapidly answer :

$\frac{1}{8}$ of 56 = ?	49 ÷ 7 = ?	.60 of 250 = ?	800 + 400 = ?
$\frac{3}{8}$ of 24 = ?	98 ÷ 7 = ?	.80 of 175 = ?	300 + 800 = ?
$\frac{5}{8}$ of 72 = ?	81 ÷ 27 = ?	$.11\frac{1}{9}$ of 63 = ?	600 + 700 = ?
$\frac{7}{8}$ of 64 = ?	96 ÷ 4 = ?	$.62\frac{1}{2}$ of 84 = ?	800 + 500 = ?
$\frac{1}{9}$ of 108 = ?	108 ÷ 3 = ?	$.28\frac{1}{4}$ of 28 = ?	900 + 300 = ?

6. What is the area of a 12-inch square?
7. A square contains 144 sq. ft. What is the length of one side?
8. What is the area of a rectangle 12 in. long and 8 in. wide? the length of the perimeter? the length of the base? the altitude of the rectangle?
9. A square mile contains how many acres?
10. How many cubic inches are there in a 10-inch cube?

**Written.**

1. How many yards of carpet a yard wide will it take to cover a floor 16 ft. 6 in. long and 10 ft. wide, allowing nothing for matching?

2. How many square rods equal an acre? At the rate of \$160 an acre, how much is a lot of land 8 rd. square worth?

3. How much will it cost to concrete a sidewalk 132 ft. 5 in. long and 4 ft. wide at 65¢ a square yard?

4. How many cubic inches are there in a block 3 ft. 6 in. long, 18 in. wide, and 6 in. high? How many cubic feet are there in the block?

5. How many cubic feet are there in the pedestal of a monument that is a rectangular solid 4 ft. high, 6 ft. 6 in. long, and 6 ft. 6 in. wide?

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6. How much is a rectangular lot of land, 384 ft. long and 192 ft. wide, worth at \$500 an acre?

7. How wide must a board 10 ft. 8 in. long be to cover exactly 8 sq. ft.?

8. Measure the length, the width, and the height of your schoolroom, and find how many cubic feet of air it contains.

9. How many cubic yards of earth must be dug to make a cellar 36 ft. long, 18 ft. wide, and 6 ft. deep?

10. How much will it cost to dig a cellar 20 ft. 6 in. long, 18 ft. wide, and 6 ft. 3 in. deep, at \$1.60 a cubic yard?

## XXX

## Oral.

Rapidly add :

bu. pk.	bu. pk.	bu. pk.	bu. pk. qt.	bu. pk. qt.
3 1	1 2	6 3	5 1 3	8 2 4
<u>2 2</u>	<u>4 2</u>	<u>3 4</u>	<u>3 0 6</u>	<u>5 1 1</u>
gal. qt.	gal. qt.	gal. qt.	gal. qt. pt.	gal. qt. pt.
6 3	8 7	5 1	5 4 1	4 2 0
<u>4 5</u>	<u>3 4</u>	<u>8 2</u>	<u>4 6 0</u>	<u>3 1 1</u>

1. From a bushel take 3 pk.
2. From  $\frac{3}{4}$  of a bushel take 16 qt.
3. How many days are there from June 1 to July 20?
4. How much will 62 pk. of corn cost at \$1 a bushel?
5. How many hours are there in  $\frac{3}{4}$  of a day?

Rapidly add :

yd. ft.	ft. in.	yd. ft.	yd. ft. in.	yd. ft. in.
4 2	6 9	12 0	4 1 8	15 1 5
<u>8 1</u>	<u>9 3</u>	<u>14 1</u>	<u>5 0 6</u>	<u>14 1 3</u>
da. hr.	hr. min.	min. sec.	da. hr. min.	da. hr. min.
4 7	9 10	15 30	4 8 14	5 7 9
<u>3 6</u>	<u>5 30</u>	<u>14 20</u>	<u>2 10 28</u>	<u>6 8 3</u>

6. From  $1\frac{3}{4}$  bu. take 3 pk.
7. One third of a bushel equals how many pecks?  
how many quarts? how many pints?
8. Two thirds of a gallon equals how many quarts?  
how many pints? how many gills?
9. How many minutes are there in  $\frac{2}{3}$  of an hour?

10. How many days are there from June 1 to September 6?

**Written.**

1. Add 3 gal. 7 qt., 4 gal. 1 pt., 6 qt. 1 pt., and 3 qt 3 gi.

2. Add 3 bu. 6 qt., 3 bu. 2 pk., 3 pk. 1 pt., and 6 qt. 1 pt.

3. From 4 gal. 1 pt. take  $11\frac{1}{2}$  qt.; take 3 qt. 1 pt.

4. How much will  $6\frac{3}{4}$  bu. of beans cost at 8¢ a quart?

5. How much will 18 bu. 3 pk. of corn cost at  $62\frac{1}{2}$ ¢ a bushel?

6. Add 8 qt. 1 pt. 2 gi., 6 qt. 1 pt. 3 gi., and 5 qt. 0 pt. 2 gi.

7. From  $4\frac{1}{2}$  gal. take  $1\frac{1}{3}$  gal.; take  $4\frac{5}{8}$  qt.

8. From a barrel of vinegar containing  $31\frac{1}{2}$  gal. there were taken at one time  $6\frac{3}{4}$  gal., and at another time  $12\frac{1}{8}$  gal. How much was the remainder worth at 7¢ a quart?

9. I bought at one time 8 gross 6 doz. pencils, and at another time 150 doz. How much are they worth at  $2\frac{1}{2}$ ¢ apiece?

10. I use 3 pt. of milk daily. At 9¢ a quart, how much is my milk bill for the month of May?

### XXXI

**Oral.**

Rapidly subtract:

bu.	pk.	bu.	pk.	bu.	pk.	bu.	pk.	qt.	bu.	pk.	qt.
4	3	6	0	4	1	5	3	3	8	1	6
2	1	3	1	1	3	3	2	1	5	3	2

gal.	qt.	gal.	qt.	gal.	qt.	gal.	qt.	pt.	gal.	qt.	pt.
8	3	5	0	6	1	7	3	1	8	3	0
4	1	2	3	4	2	4	2	1	3	2	1

1. How much will  $\frac{1}{4}$  lb. of butter cost at 30¢ a pound?

2. How many gallons are there in 7 qt. and 4 qt.?

3. How many bushels are there in 6 pk. + 3 pk.?

4. How long should it take a boy to plow 8 furrows, if it takes him  $18\frac{3}{4}$  min. to plow 5 furrows?

5.  $18\frac{3}{4} \div 5 = ?$

Rapidly subtract :

yd.	ft.	ft.	in.	yd.	ft.	yd.	ft.	in.	yd.	ft.	in.
6	2	5	10	8	0	7	1	15	15	3	4
2	1	3	8	5	2	4	2	8	7	1	8

da.	hr.	hr.	min.	min.	sec.	da.	hr.	min.	da.	hr.	min.
8	3	12	30	15	20	7	10	50	6	6	6
4	7	8	20	8	50	4	8	20	4	8	15

6. How many gallons are there in 11 qt. + 6 qt.?

7. How many quarts are there in 16 gi. + 5 gi. + 8 gi. + 1 pt.?

8. If 3 girls together can earn \$2 $\frac{1}{4}$  in a day, how much could 5 girls earn, at the same rate?

9. How many lamps, at 7 dimes each, can be bought for 9 dimes in money and 7 doz. eggs at the rate of 2 dimes per dozen eggs?

10. Two thirds of 27 is how many times  $\frac{3}{4}$  of 12?

**Written.**

1. From  $1\frac{3}{4}$  bu. take  $3\frac{3}{8}$  pk.
2. From  $7\frac{7}{8}$  pk. take 1 bu. 2 pk. 6 qt. 1 pt.
3. From 8 gal. 4 qt. take 3 gal. 5 qt. 1 pt.
4. Add  $\frac{1}{4}$  bu. + 6 qt. + 2 bu.,  $3\frac{1}{2}$  qt. + 3 bu.,  $2\frac{1}{2}$  pk. +  $8\frac{1}{2}$  qt.
5. A carload of wheat weighing 14 T. 5 cwt. was sold for \$427.50. Allowing 60 lb. to a bushel, how much was the wheat worth a bushel?

- 
6. From  $1\frac{3}{4}$  bu. take 3 pk. 4 qt.
  7. Add 24 yd. 2 ft., 74 yd. 1 ft., 46 yd. 1 ft.
  8.  $34.16 - 25.006 = ?$
  9.  $321.06 + 508.7 + .0675 + .045 + 557.6 = ?$
  10. Find the decimal value of  $.37\frac{1}{2} + \frac{7}{8} + .42 - (1 - .68\frac{3}{4})$ .

**XXXII****Oral.**

Rapidly answer :

$65 + 16 = ?$	$81 - 16 = ?$	$23 \times 4 = ?$	$92 \div 4 = ?$
$15 + 78 = ?$	$84 - 69 = ?$	$27 \times 2 = ?$	$96 \div 24 = ?$
$28 + 14 = ?$	$42 - 14 = ?$	$14 \times 7 = ?$	$72 \div 4 = ?$
$13 + 39 = ?$	$43 - 28 = ?$	$18 \times 4 = ?$	$57 \div 19 = ?$
$14 + 58 = ?$	$72 - 14 = ?$	$17 \times 5 = ?$	$78 \div 6 = ?$
$76 + 15 = ?$	$81 - 65 = ?$	$16 \times 4 = ?$	$70 \div 14 = ?$
$16 + 64 = ?$	$80 - 17 = ?$	$13 \times 7 = ?$	$84 \div 6 = ?$
$28 + 17 = ?$	$83 - 66 = ?$	$56 \times 2 = ?$	$84 \div 28 = ?$
$56 + 15 = ?$	$45 - 16 = ?$	$19 \times 3 = ?$	$96 \div 32 = ?$
$\frac{12+6}{6} = ?$	$\frac{25+5}{5} = ?$	$\frac{32+8}{8} = ?$	$\frac{42+7}{7} = ?$
			$\frac{45+9}{9} = ?$

1. Twice a number + 3 times the number - 4 times the number + 2 times the number equals how many times the number?

2. At the rate of 2 lb. for 32¢, find the cost of  $5\frac{3}{8}$  lb. of beef.

3. In an orchard  $\frac{1}{2}$  of the trees are apple trees,  $\frac{1}{3}$  are peach trees, and the remainder are pear trees. What part of the orchard is pear trees?

4. Mr. Smith has 50 mi. to go, and has gone  $\frac{3}{8}$  of the distance. How far has he still to go?

5. A man owned  $\frac{3}{4}$  of a boat, and sold  $\frac{1}{8}$  of the boat. What part of the boat does he still own?

Rapidly answer:

$$24 + 48 = ? \quad 92 - 17 = ? \quad 20 \times 9 = ? \quad 180 \div 9 = ?$$

$$56 + 14 = ? \quad 81 - 58 = ? \quad 30 \times 8 = ? \quad 300 \div 6 = ?$$

$$32 + 27 = ? \quad 97 - 49 = ? \quad 40 \times 7 = ? \quad 560 \div 7 = ?$$

$$89 + 13 = ? \quad 92 - 36 = ? \quad 50 \times 6 = ? \quad 420 \div 6 = ?$$

$$65 + 24 = ? \quad 82 - 46 = ? \quad 60 \times 8 = ? \quad 144 \div 6 = ?$$

$$15 + 32 = ? \quad 95 - 38 = ? \quad 70 \times 9 = ? \quad 320 \div 8 = ?$$

$$87 + 16 = ? \quad 22 - 15 = ? \quad 80 \times 7 = ? \quad 810 \div 9 = ?$$

$$39 + 23 = ? \quad 43 - 16 = ? \quad 90 \times 6 = ? \quad 490 \div 7 = ?$$

$$45 + 19 = ? \quad 72 - 18 = ? \quad 60 \times 7 = ? \quad 480 \div 8 = ?$$

$$72 + 18 = ? \quad 55 - 17 = ? \quad 50 \times 9 = ? \quad 450 \div 9 = ?$$

$$\frac{16+4}{4} = ? \quad \frac{21+7}{7} = ? \quad \frac{44+11}{11} = ? \quad \frac{60+12}{12} = ? \quad \frac{96+8}{8} = ?$$

6. Three times a number - 2 times the number + 4 times the number - 5 times the number, equals how many times the number?

7. If 5 apples cost  $\frac{3}{4}$  of two dimes, how much will 16 apples cost at the same rate?

8. Jane paid  $\$2\frac{1}{2}$  for silk, at the rate of  $\$5$  a yard. How much did she buy?

9. I paid  $\$4800$  for a house, and I sold it for  $\frac{1}{12}$  more than it cost me. How many dollars did I gain? How many hundredths?

10. One fourth of my land is worth  $\$1500$ . How much is the whole of it worth?

**Written.**

1. A school playground is  $18\frac{3}{4}$  yd. wide and  $27\frac{3}{4}$  yd. long. What is the distance around it?

2. How far can a boatman row in  $4\frac{7}{12}$  hr. at the rate of  $3\frac{1}{2}$  mi. per hour?

3. Simplify  $\frac{3\frac{1}{2} \times 8 \times 7\frac{1}{2}}{12\frac{1}{8} \times 16 \times \frac{1}{2}}$ .

4. 48 is how many hundredths of 320?

5. If 32 is  $\frac{8}{9}$  of a certain number, what is the number?

6. A piece of woolen goods was  $78\frac{5}{8}$  yd. long. After washing, it was  $69\frac{5}{8}$  yd. long. How many yards did it shrink?

7. A farmer planted  $56\frac{5}{8}$  A. of his farm in wheat,  $42\frac{3}{4}$  A. in corn,  $28\frac{7}{8}$  A. in oats, and as much as  $\frac{1}{8}$  of the sum of these in rye. How many acres in all did he plant?

8. A man earns  $\$215$  per month. He spends  $\$36\frac{1}{2}$  for rent, and  $1\frac{1}{2}$  times as much for his other living expenses. How much has he left?

9. Find the combined weight of 2 stacks of hay containing 5 T. 16 cwt. 75 lb. and 4 T. 5 cwt. 50 lb.

10. A cellar is excavated 50 ft. long, 35 ft. wide, 8 ft. deep. How much does the excavation cost at  $\$1.25$  per cubic yard?



## XXXIII

Oral.

Rapidly answer :

12 is what part of 72? of 108? of 144? of 36? of 60?

What part of 84 is 7? is 12? is 4? is 21? is 28?

One half is what part of 4? of 6? of 8? of 12? of 16?

What part of 20 is  $\frac{1}{2}$ ? is  $\frac{1}{4}$ ? is  $\frac{1}{6}$ ? is  $\frac{2}{3}$ ? is  $\frac{4}{5}$ ?

Compare 1 with  $\frac{3}{8}$ ; with  $\frac{7}{8}$ ; with  $\frac{5}{8}$ ; with  $\frac{9}{8}$ .

Compare  $\frac{3}{4}$  with 1; with 2; with 5; with 8.

1. What part of 3 is  $\frac{3}{4}$ ? What part of 2 is  $\frac{3}{4}$ ? What part of 4 is  $\frac{3}{4}$ ? What part of 5 is  $\frac{3}{4}$ ?

2. A book costs \$3, and a ball \$ $\frac{3}{4}$ . What part of the cost of the book equals the cost of the ball?

3. A hat is bought for \$2, and sold at a gain of \$ $\frac{3}{4}$ . What part of the cost equals the gain?

4. A farm cost \$8000, and was sold at a gain of \$1000. What part of the cost was the gain? How many hundredths of the cost was the gain?

5. If 3 men can do a piece of work in  $3\frac{1}{2}$  da., how long will it take 5 men to do it?

---

Rapidly answer :

Compare 2 with 6; 4 with 8; 5 with 20; 6 with 36; 6 with 54.

6 is what part of 24? of 36? of 54? of 72? of 21?

What part of 4 is 3? of 6 is 3? of 6 is 5? of 9 is 6? of 8 is 4?

Compare 1 with  $\frac{5}{8}$ ; with  $\frac{7}{8}$ ; with  $\frac{4}{8}$ ; with  $\frac{1}{8}$ .

Compare  $\frac{3}{4}$  with 1; with 4; with 5; with 7; with 3.

What part of 9 is  $\frac{3}{4}$ ? of 7 is  $\frac{5}{8}$ ? of 4 is  $\frac{2}{3}$ ? of 6 is  $\frac{3}{4}$ ? of 2 is  $\frac{3}{5}$ ?

6. What part of 5 is  $\frac{1}{2}$  of  $\frac{3}{4}$ ?

7. A has \$5 and B has \$2 $\frac{1}{2}$ . What part of A's money equals B's money?

8. Sarah bought 5 yd. silk and used 3 $\frac{1}{2}$  yd. What part of the silk then remained?

9. A watch costs \$40 and a chain costs \$12. What part of the cost of the watch equals the cost of the chain?

10. A dealer bought a chair for \$8, and sold it to gain \$2. What fractional part of the cost was the gain? What decimal part was the gain?

Written.

1. Reduce  $\frac{\frac{3}{5}}{\frac{3}{4}}$  to a simple fraction.

2. What part of  $\frac{5}{8}$  is  $\frac{1}{3}$ ?

3. What part of  $\frac{5}{8}$  is  $\frac{2}{5}$ ? of  $\frac{7}{8}$  is  $\frac{3}{4}$ ? of 3 $\frac{1}{2}$  is  $\frac{4}{5}$ ?

4. What decimal part of 225 is 15?

5. Glen has 9 rows of corn to hoe. What part of his work is done when he has hoed 7 $\frac{1}{2}$  rows? What decimal part of his work is done?

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6. Frank is 4 $\frac{1}{2}$  yr. old and his sister is 18 yr. old. What fractional part of the sister's age is Frank's age? What decimal fraction does your answer equal?

7. How many hundredths of 25 is 1 $\frac{1}{4}$ ?

8. What decimal part of 16 $\frac{2}{3}$  is 12 $\frac{1}{2}$ ?

9. What decimal part of 33 $\frac{1}{3}$  is 6 $\frac{1}{4}$ ?

10. A farm that costs \$3500 is sold for \$4000. How much money is gained? What part of the cost is the gain? What decimal part of the cost is the gain?

## XXXIV

Oral.

Rapidly add :

124	132	163	148	183	136	145	187	196	246	244	276
<u>85</u>	<u>45</u>	<u>37</u>	<u>23</u>	<u>54</u>	<u>54</u>	<u>55</u>	<u>33</u>	<u>54</u>	<u>64</u>	<u>39</u>	<u>45</u>

By moving the decimal point, multiply each of the following numbers by 10; by 100; by 1000 :

25; 2.5; 3.87; 25.7; 50; .25; .625; 34.5; 8.75; .875.

Read :

.0125; 50.75; .01875; .00006; .001605; 98.743; .0102.

Read as tenths :

.85; .125; .625; .875; 1.5; 7.55; .5125; 7.6375; 6.5000.

Name at sight the number of decimal places in the product :

$.07 \times 2.5$	$.33 \times 5$	$1.36 \times 1.04$	$.004 \times .2$
$16 \times 4.8$	$.003 \times 10$	$.425 \times .262$	$.04 \times 2$
$84 \times .5$	$1.25 \times 100$	$3.2 \times 1.53$	$.0004 \times .2$
$7.5 \times .05$	$4.25 \times 1000$	$.67 \times 4.23$	$5.6 \times 8.7$
$3 \times .006$	$4.25 \times .005$	$8.4 \times .5$	$.56 \times .087$

1. How much will 25 bu. of corn cost at \$.75 a bushel? \*

2. In 1 rd. there are how many feet? In 30 rd. there are how many feet?

\* SUGGESTION:

$$\frac{$.75 \times 100}{4} = p$$

3. Multiply \$48.40 by 25.
4. Multiply \$48.40 by .25.
5. How much will 12 yd. of cloth cost at \$2.75 a yard?

Rapidly add :

142	127	127	134	127	152	152	375	237	193	236	242
<u>35</u>	<u>42</u>	<u>142</u>	<u>45</u>	<u>87</u>	<u>36</u>	<u>136</u>	<u>67</u>	<u>45</u>	<u>49</u>	<u>144</u>	<u>128</u>

Read as hundredths :

.125; 5.375; .0125; 8.750; .0625; .0875; 7.5; 3.0025.

6. In 6.5 how many hundred-thousandths are there?
7. Reduce .000600 to lowest decimal terms.
8. Add  $2\frac{1}{2}$  and .06.
9. How much will 10.5 doz. eggs cost at 24¢ a dozen?
10. In a dozen, a score, and a gross of marbles, how many are there?

Written.

1. Reduce to common fractions: .625;  $.82\frac{1}{2}$ ;  $.18\frac{1}{3}$ .
2. Reduce to decimal fractions:  $\frac{5}{16}$ ;  $\frac{37}{150}$ ;  $\frac{33}{80}$ .
3. What is the sum of 61.843, 8.9, 21.04,  $15\frac{3}{10}$ , and  $3\frac{1}{4}$ ?
4. Write fifty thousand five millionths; fifty thousand and five millionths.
5.  $4\frac{1}{4} - .004\frac{1}{2} = ?$
6. Find the difference between  $8\frac{1}{4}$  and  $.08\frac{1}{4}$ .
7. From a piece of cloth containing  $40\frac{1}{2}$  yd., 18.015 yd. were sold. How many yards remained?

8. A druggist bought 74.52 lb. of a drug. In March he sold  $10\frac{3}{4}$  lb., in April 25.125 lb., in May  $21\frac{3}{8}$  lb., and the remainder in June. How many pounds did he sell in June?

9. Find .4 of 8.75.

10.  $.90\frac{1}{4}$  of 160.48 = ?

### XXXV

#### Oral.

Rapidly give the decimal equivalents of :

$\frac{1}{2}$ ;  $\frac{1}{4}$ ;  $\frac{1}{8}$ ;  $\frac{1}{5}$ ;  $\frac{1}{6}$ ;  $\frac{1}{7}$ ;  $\frac{1}{8}$ ;  $\frac{1}{9}$ ;  $\frac{2}{3}$ ;  $\frac{3}{4}$ ;  $\frac{2}{5}$ ;  $\frac{3}{5}$ ;  $\frac{4}{5}$ ;  $\frac{5}{8}$ .

1.  $.16\frac{1}{2}$  equals what common fraction?

2. How many cents equal  $\$ \frac{1}{5}$  and 50¢?

3. What is the difference between  $1\frac{1}{4}$  and .75?

4. Find .05 of 1.3.

5. Find .03 of 1.5. \_\_\_\_\_

Rapidly give the decimal equivalents of :

$\frac{2}{3}$ ;  $\frac{1}{3}$ ;  $\frac{4}{5}$ ;  $\frac{2}{5}$ ;  $\frac{5}{6}$ ;  $\frac{2}{7}$ ;  $\frac{3}{7}$ ;  $\frac{4}{7}$ ;  $\frac{5}{7}$ ;  $\frac{6}{7}$ ;  $\frac{5}{8}$ ;  $\frac{6}{8}$ ;  $\frac{7}{8}$ ;  $\frac{2}{9}$ ;  $\frac{4}{9}$ .

6. How much will .7 lb. cost at 15¢ a pound?

7. Reduce  $\frac{1}{2}\frac{2}{3}$  to a decimal.

8. Reduce 4.45 to a common fraction.

9. Find .02 of .02.

10. How much will 25 A. of land cost at \$4.20 an acre?

#### Written.

1. Two thirds is how many hundredths of  $\frac{5}{6}$ ?

2. What part of  $3\frac{1}{4}$  is  $2\frac{1}{2}$ ? What decimal part is it?

3. What decimal part of a yard is 31 in.?

4. What decimal part of a pound is 14 oz. (Avoir.)?

5. How much greater is 1.4 than .000014?

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6. If a sack of salt contains 94.16 lb., how many pounds will 17 such sacks contain?

7. A farmer bought 124 A. of land at \$35.75 an acre, and sold the whole for \$6000. How much did he gain or lose?

8. If an acre of land produces 35.7 bu. of wheat, how many bushels will 5.12 A. produce?

9.  $12.05 \times .07 = ?$

10. Multiply 19.07 by  $.16\frac{2}{3}$ .

### XXXVI

#### Oral.

Rapidly read as common fractions:

.50;  $.33\frac{1}{3}$ ;  $.6\frac{2}{3}$ ;  $.87\frac{1}{2}$ ;  $.12\frac{1}{2}$ ;  $.16\frac{2}{3}$ ; .20;  $.37\frac{1}{2}$ ; .25; .80;  
 $.83\frac{1}{3}$ ;  $.62\frac{1}{2}$ ; .40; .75; .60;  $.66\frac{2}{3}$ ;  $.08\frac{1}{3}$ ;  $.14\frac{2}{7}$ ;  $.11\frac{1}{6}$ ;  $.22\frac{2}{3}$ .

Rapidly give the products:

$24 \times .33\frac{1}{3}$ ;  $64 \times .06\frac{1}{4}$ ;  $32 \times .62\frac{1}{2}$ ;  $26 \times .50$ ;  $24 \times .08\frac{1}{3}$ ;  
 $16 \times .12\frac{1}{2}$ ;  $25 \times .80$ ;  $5 \times .40$ ;  $54 \times .66\frac{2}{3}$ ;  $14 \times .14\frac{2}{7}$ .

1. Find  $.33\frac{1}{3}$  of 693.

2. John found 50¢, which is  $\frac{5}{4}$  of  $\frac{1}{2}$  of what he then had. How much had he then? How much had he at first?

3. How much will  $.5\frac{1}{2}$  of a pound cost at 2¢ a pound?

4. From  $\frac{1}{12}$  take  $.005\frac{1}{2}$ .

5. A square field is  $12\frac{3}{4}$  rd. on a side. What is the distance around it in rods? What is the distance around it called? What is its area in square rods?

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Rapidly give the products:

$56 \times .37\frac{1}{2}$ ;  $84 \times .14\frac{2}{7}$ ;  $72 \times .08\frac{1}{8}$ ;  $96 \times .12\frac{1}{2}$ ;  $12 \times .08\frac{1}{8}$ ;  $.66\frac{2}{3}$  of 75;  $.87\frac{1}{2}$  of 1600;  $.33\frac{1}{3}$  of 1500;  $.66\frac{2}{3}$  of 2700;  $.11\frac{1}{9}$  of 1800.

6. How many square feet are there in the area of a rectangle the base of which is  $\frac{7}{12}$  ft., and the altitude, or height, 2 ft.?

7. A school yard, having a rectangular shape, measures 4880 sq. ft., and is 80 ft. wide. How long is it?

8. In a house there are two rooms each measuring 9 ft. by 12 ft. What is the total area of the floor of the two rooms?

9. If two rooms are each 9 ft. wide by 12 ft. long by 10 ft. high, what is the total cubic contents of the two rooms?

10. Lay two objects on the floor estimating the distance between them to be 4 yd., then measure the distance accurately and tell how much in inches the error in the estimating was.

**Written.**

1. What is the cost of fencing a square field 8 rd. on a side at 30¢ a foot?

2. How much will it cost to fence a rectangular field 16 rd. long and 10 rd. wide if the fence costs  $62\frac{1}{2}$ ¢ a yard?

3. How many feet of molding will be needed for the four walls of a room 16 ft. 4 in. long and 14 ft. 8 in. wide?

4. How many steps, counting 2 ft. to a step, will a boy take in walking around a rectangular field 8 rd. long and 6 rd. wide?

5. In a 24-story building the floors are 16 ft. apart, and an elevator runs to the roof. If the elevator makes 50 round trips a day, how many feet does it travel a day?

6. How many acres are there in a square mile? How many acres are there in a field 6 mi. long and 5 mi. wide? How many farms of 75 A. each can you make from the field? \*

7. How many rods of fence will inclose a farm a mile square? one and a quarter miles square?

8. In how many hours and minutes will a person walk 8 mi., if he takes a step 2 ft. 8 in. every second?

9. How much will it cost to carpet a room 18 ft. long and 15 ft. wide with carpet a yard wide to cost \$1.25 a yard, no allowance being made for matching?

10. How much will it cost to dig a cellar 25 ft. long, 18 ft. wide, and 9 ft. deep, at 23¢ a cubic yard?

### XXXVII

#### Oral.

Rapidly find the cost of the following articles:

40 tables at \$1.25 each; 60 hinges at \$.10 a dozen;  
500 ft. timber at \$2.40 per 100; 40 tables at \$1.75 each;

\* SUGGESTION:  $\frac{6 \times 5 \times 640}{75} = ?$



60 castors at \$.25 a dozen; 600 ft. timber at \$2.25 per 100; 45 tables at \$1.66 $\frac{2}{3}$  each; 80 chains at \$.75 each; 600 ft. timber at \$2.33 $\frac{1}{3}$  per 100; 40 tables at \$1.87 $\frac{1}{2}$ ; 80 chains at \$.50 each; 500 ft. timber at \$2.80 per 100; 45 tables at \$1.33 $\frac{1}{3}$  each; 60 chains at \$2.66 $\frac{2}{3}$  each; 400 ft. timber at \$2.75 per 100.

1. What is .02 of .010?
2. If an ounce of silver costs \$.50, find the cost of .8 of an ounce.
3. How much greater is  $\frac{1}{5}$  of an eagle than  $\frac{1}{5}$  of a dime?
4. What is  $\frac{1}{5}$  of .012?
5. What is .08 $\frac{1}{3}$  of 2400?

Rapidly find the cost of the following articles :

64 baskets at \$.12 $\frac{1}{2}$ each	30 knives at \$.60 each
64 baskets at .37 $\frac{1}{2}$ each	30 knives at 1.80 each
64 baskets at .75 each	45 knives at .33 $\frac{1}{3}$ each
36 baskets at .16 $\frac{2}{3}$ each	84 knives at .14 $\frac{2}{7}$ each
36 baskets at .08 $\frac{1}{3}$ each	40 knives at .75 each
200 oysters at \$.75 per 100	
500 oysters at 1.00 per 100	
600 oysters at 1.25 per 100	
300 oysters at .80 per 100	
800 oysters at .60 per 100	

6. What common fraction is equal to the sum of .2 $\frac{1}{2}$  and .5?
7. If .12 $\frac{1}{2}$  of an acre costs \$25, find the cost of an acre.

8. At  $\$2\frac{1}{2}$  per C, find the cost of 125 ft. of timber.
9. What is  $.08\frac{1}{8}$  of  $\$60$ ?
10. What part of 16 is  $\frac{5}{8}$ ?

**Written.**

1. What is the cost of 8409 ft. of boards at  $\$28.25$  a thousand (per M)? \*
  2. For the building of a certain house it is estimated that 84728 bricks will be needed. What will be the cost of the bricks at  $\$9.50$  per M? (85000 must be ordered.)
  3. Find the cost of 867 lb. of pork at  $\$6.25$  per C.
  4. A day's excursion is  $\$1.75$  a person. Meals are served at  $75\%$  a person. How much will it cost a party of 5 adults if all but 2 take one meal on board and they hire a stateroom for the party at  $\$1.50$ ?
  5. How much will it cost to build a railway 250 mi. long at an average cost of  $\$2300$  a mile?
- 
6. How much will 94520 ft. of stone cost at  $\$48$  per M? (95000 ft. must be ordered.)
  7. Find the cost of 912 lb. of beef at  $\$9$  per C; of 840 lb. at  $\$8.75$  per C.
  8. What is the cost of 8783 ft. of scantling at  $\$4.62\frac{1}{2}$  per M?
  9. Find the value of  $.0035 \times 5000$ .
  10.  $453 - (32\frac{2}{15} + \frac{5}{3} - 10) = ?$

\* SUGGESTION :

$$\$28.25 \times 8.409 = ?$$

## XXXVIII

## Oral.

Rapidly find the number of articles that can be bought :

For \$12 at \$.12 $\frac{1}{2}$  apiece; for \$21 at \$.60 apiece; for \$21 at \$.37 $\frac{1}{2}$  apiece.

For \$15 at \$.33 $\frac{1}{3}$  apiece; for \$21 at \$.50 apiece; for \$21 at \$.75 apiece.

For \$9 at \$.37 $\frac{1}{2}$  apiece; for \$21 at \$.87 $\frac{1}{2}$  apiece; for \$21 at \$.16 $\frac{2}{3}$  apiece.

For \$6 at \$.66 $\frac{2}{3}$  apiece; for \$20 at \$.40 apiece; for \$20 at \$.33 $\frac{1}{3}$  apiece.

For \$24 at \$.80 apiece; for \$25 at \$.16 $\frac{2}{3}$  apiece; for \$20 at \$.62 $\frac{1}{2}$  apiece.

1.  $\frac{1}{4} = \frac{?}{100}$  of  $\frac{3}{4}$ ?
  2. What decimal part of \$25 is \$ $\frac{1}{2}$ ?
  3. I paid \$600 for a house and sold it at a gain of .33 $\frac{1}{3}$ . How much did I gain?
  4. How much will 50 lb. of butter cost at 3 dimes per pound?
  5. What decimal part of a pound sterling is 15 shillings?
- 

Rapidly find the number of articles that can be bought :

For \$12 at \$.25 apiece; for \$20 at \$.66 $\frac{2}{3}$  apiece; for \$25 at \$.33 $\frac{1}{3}$  apiece.

For \$12 at \$.75 apiece; for \$20 at \$.50 apiece; for \$25 at \$.25 apiece.

For \$12 at \$.16 $\frac{2}{3}$  apiece; for \$120 at \$1.25 apiece; for \$25 at \$.12 $\frac{1}{2}$  apiece.

For \$12 at \$.33 $\frac{1}{2}$  apiece ; for \$120 at \$1.50 apiece ; for \$25 at \$.83 $\frac{1}{2}$  apiece.

For \$12 at \$.37 $\frac{1}{2}$  apiece ; for \$120 at \$1.66 $\frac{2}{3}$  apiece ; for \$25 at \$.14 $\frac{2}{3}$  apiece.

6. At \$12 $\frac{1}{2}$  a barrel what part of a barrel can be bought for \$2 $\frac{1}{2}$ ? (Find the ratio of 2 $\frac{1}{2}$  to 12 $\frac{1}{2}$ .)

7. At \$4 for a ton of 2000 lb., how much will 1000 lb. cost? 2500 lb.?

8. At the rate of 3 apples for 5¢, how many apples can I buy for \$1.50?

9. At \$ $\frac{4}{5}$  a bushel, how many bushels of wheat can be bought for \$160?

10. Change  $\frac{2}{7}$  to hundredths.

### Written.

1. At \$15.25 per ton, how much will 12846 lb. of hay cost? \*

2. What is the cost of 5847 lb. of iron at \$82.50 a ton?

3. Find the cost of 6540 lb. of wool at \$580 a ton?

4. How much will 8420 lb. of pig iron cost at \$34 $\frac{1}{2}$  a ton?

5. Multiply .923 by .0045.

6. What is the cost of 3496 lb. of coal at \$5.50 a ton?

7. How much will 36847 lb. of meal cost at \$50 a ton?

8. Find the cost of 27816 lb. of oats at \$26.75 a ton.

9. Make out an appropriate bill showing that a customer has purchased 4 articles from a hardware store.

\* SUGGESTION : 
$$\frac{\$15.25 \times 12.846}{2} = ?$$

10. Put in proper bill form showing debtor and creditor:

Mr. Burke ordered, Sept. 15, 1910, from Thomas Regan, 56 Orchard Street, New York City: 6 lb. cheese at 14¢; 2 lb. butter at 34¢; 3 lb. cooking butter at 25¢; 4 doz. eggs at 32¢; 3 lb. lard at 13¢.

### XXXIX

#### Oral.

Rapidly reduce to improper fractions:

$5\frac{2}{3}$ ;  $2\frac{5}{8}$ ;  $3\frac{2}{3}$ ;  $8\frac{2}{3}$ ;  $4\frac{3}{4}$ ;  $6\frac{2}{7}$ ;  $5\frac{1}{8}$ ;  $9\frac{1}{3}$ ;  $7\frac{2}{3}$ ;  $8\frac{2}{4}$ ;  $6\frac{5}{8}$ ;  $9\frac{4}{5}$ ;  $2\frac{1}{3}$ ;  $3\frac{1}{4}$ ;  $1\frac{1}{5}$ ;  $2\frac{1}{6}$ ;  $2\frac{3}{8}$ ;  $2\frac{2}{9}$ ;  $2\frac{2}{5}$ ;  $3\frac{2}{3}$ .

1. How far will a man drive in an hour at the rate of 21 mi. in  $3\frac{1}{2}$  hr.?

2. A vessel sailed 23 mi. in  $4\frac{2}{5}$  hr. How far did it sail in 1 hr.? in 12 hr.?

3. A kite rose 46 rd. in  $3\frac{5}{8}$  min. At what rate per minute did it rise? How far will it rise at that rate in 6 min.?

4. Reduce  $.16\frac{1}{2}$  to a common fraction. What kind of a fraction is  $\frac{16\frac{1}{2}}{100}$ ? Reduce  $.13\frac{1}{3}$  to a common fraction.

5. From  $1\frac{1}{4}$  take .75. From  $.04\frac{1}{2}$  take .004.

Rapidly reduce to improper fractions:

$6\frac{1}{8}$ ;  $5\frac{1}{4}$ ;  $3\frac{4}{5}$ ;  $2\frac{2}{4}$ ;  $3\frac{2}{5}$ ;  $4\frac{3}{8}$ ;  $7\frac{4}{5}$ ;  $4\frac{2}{7}$ ;  $7\frac{5}{9}$ ;  $7\frac{2}{4}$ ;  $4\frac{4}{5}$ ;  $5\frac{2}{3}$ ;  $8\frac{4}{5}$ ;  $2\frac{5}{5}$ ;  $6\frac{2}{5}$ ;  $5\frac{2}{10}$ ;  $7\frac{5}{10}$ ;  $3\frac{2}{10}$ ;  $6\frac{2}{10}$ ;  $4\frac{1}{3}$ .

6. How much will 9 bbl. of flour cost if 2 bbl. cost \$10 $\frac{2}{3}$ ?

7. If  $2\frac{2}{3}$  yd. of cloth cost \$16, how much will 1 yd. cost?
8. If  $3\frac{1}{2}$  T. of coal cost \$21, how much will 1 T. cost?
9. If 5 hats can be bought for \$10 $\frac{1}{4}$ , how many hats can be bought for \$18?
10. How many screws are there in  $1\frac{1}{4}$  gross and  $1\frac{1}{4}$  doz.?

**Written.**

1. If  $3\frac{1}{8}$  yd. cost \$35, how many yards can be bought for \$4?
  2. If a train travels  $12\frac{1}{8}$  mi. in  $20\frac{4}{5}$  min., how far will it travel in  $\frac{5}{8}$  hr. at the same rate?
  3. A man invested \$9600 in merchandise and gained .25 of that amount. How much money did he gain?
  4. If a real estate dealer sells a house for \$7500 that cost \$6000, what part of the cost is the gain? What decimal part of the cost is the gain?
  5. What decimal part of  $\frac{5}{8}$  is  $\frac{3}{4}$ ?
- 
6. How many bushels of oats at \$ $\frac{3}{5}$  a bushel will pay for  $\frac{5}{8}$  of a barrel of flour at \$7 $\frac{1}{2}$  a barrel?
  7. Reduce  $\frac{2}{815}$  to a decimal.
  8. If  $\frac{2}{3}$  of a farm is worth \$9000, how much is  $\frac{5}{12}$  of it worth?
  9. Find the cost of 196 $\frac{1}{8}$  lb. of meat at the rate of  $6\frac{3}{4}$  ¢ a pound.
  10. How much will  $2\frac{2}{5}$  T. of hay cost if  $3\frac{1}{5}$  T. cost \$48?

## XL

## Oral.

Rapidly reduce to mixed numbers :

$\frac{28}{5}$ ;  $\frac{41}{6}$ ;  $\frac{23}{8}$ ;  $\frac{44}{9}$ ;  $\frac{24}{7}$ ;  $\frac{25}{8}$ ;  $\frac{26}{9}$ ;  $\frac{27}{10}$ ;  $\frac{16}{3}$ ;  $\frac{14}{6}$ ;  $\frac{25}{10}$ ;  $\frac{26}{7}$ ;  
 $\frac{34}{9}$ ;  $\frac{15}{2}$ ;  $\frac{25}{4}$ ;  $\frac{22}{9}$ ;  $\frac{32}{4}$ ;  $\frac{20}{3}$ ;  $\frac{77}{8}$ ;  $\frac{22}{5}$ .

1.  $\frac{1}{2} = \frac{?}{100}$  of  $\frac{1}{2}$ ?  $\frac{1}{2} = \frac{?}{100}$  of  $\frac{1}{4}$ ?  $\frac{1}{4} = \frac{?}{100}$  of  $\frac{1}{2}$ ?
2. 40 is  $\frac{5}{8}$  of what number?
3. 36 is  $.37\frac{1}{2}$  of what number?
4. If \$48 is  $.33\frac{1}{3}$  of what I paid for a box of pens, how much did the pens cost me?
5. From  $\frac{1}{8}$  take .002.

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Rapidly reduce to mixed numbers :

$\frac{20}{3}$ ;  $\frac{23}{12}$ ;  $\frac{45}{11}$ ;  $\frac{68}{16}$ ;  $\frac{34}{9}$ ;  $\frac{22}{9}$ ;  $\frac{62}{8}$ ;  $\frac{72}{11}$ ;  $\frac{26}{20}$ ;  $\frac{100}{30}$ ;  $\frac{32}{7}$ ;  $\frac{87}{10}$ ;  
 $\frac{47}{6}$ ;  $\frac{27}{6}$ ;  $\frac{12}{7}$ ;  $\frac{42}{7}$ ;  $\frac{52}{10}$ ;  $\frac{71}{10}$ ;  $\frac{24}{10}$ ;  $\frac{150}{20}$ .

6. I sold  $\frac{4}{7}$  of a field of 35 A. of land. How many acres of the field had I left?
7. A gross of pens, which cost 48¢, was sold at the rate of 2 for 1¢. How much was made on the entire gross?
8. How much will .75 of a bushel of nuts cost at 5¢ a pint?
9. How many days are there in the summer months?
10. What part of 12 is  $2\frac{1}{3}$ ?

## Written.

1. New York, May 20, 1909. Mr. Charles Johnson, Cr., to Fowler & Bros., Dr. To 37 bbl. pork at \$24.35; 127 bbl. flour at \$8.15; 3 hhd. molasses (169 gal.), at

\$ .43; 29 firkins butter (56 lb. in a firkin) at \$.31; 3 boxes raisins at \$4.65. Arrange the bill in proper form and receipt it for payment.

2. Make out a bill showing that you made 10 purchases of different articles in a grocery store.

3. If  $2\frac{1}{2}$  T. of hay cost \$30, how much will  $57\frac{3}{4}$  T. cost?

4. Find the difference between  $.33\frac{1}{3}$  of 90 and .003. From .75 take  $\frac{1}{8}$ . From  $.6\frac{3}{4}$  take  $.0017\frac{1}{8}$ .

5. A farmer having a flock of 120 sheep, sold 30, and the dogs killed  $\frac{1}{3}$  of the remainder. What part of the original number was finally left?

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6. If  $\frac{3}{8}$  of an estate is worth \$3460, what is  $\frac{4}{9}$  of it worth?

7. I bought a horse for \$286 and sold it for  $\frac{7}{9}$  of what it cost. How much did I lose by the transaction?

8. How much will  $45\frac{3}{4}$  yd. of muslin cost at \$. $12\frac{1}{2}$  a yard?

9. Find the cost of 8 cwt. 75 lb. at \$2.47 a hundred-weight.

10.  $(48\frac{15}{100} + .97) - (\frac{4}{5} + .62\frac{1}{2} + \frac{5}{8}) = ?$



## THIRD MONTH

**RAPID DRILLS** — daily.

**READING AND WRITING NUMBERS** — continued.

**THE FUNDAMENTAL OPERATIONS** — to secure quickness and accuracy.

**COMMON FRACTIONS** — reviewed.

**DECIMAL FRACTIONS** — reduction, addition, subtraction, multiplication, and division of more than three orders.

**DENOMINATE NUMBERS** — reduction, addition, subtraction, multiplication, and division.

**MEASUREMENTS** — areas of parallelograms and of right-angled triangles.

**TABLES** — Troy weight, apothecaries' weight, and review.

**BILLS** — reviewed.

**PERCENTAGE** — Definition. Finding per cents of numbers or of fractions.

**PROBLEMS** — to cover the work of the month in common and decimal fractions and the tables and the three of the type problems. Finding a number when the number plus a fractional part of it is given.

## XLI

**Oral.**

**Rapidly add :**

56	78	25	48	65	42	65	36	29	26	56	48	59	45	27
17	16	18	18	15	18	14	26	13	18	15	17	17	18	17
13	18	19	15	14	17	16	16	15	12	17	18	18	19	18

Rapidly multiply the following by 10; by 100; by 1000:

.425 mi.; .275 rd.; .750 T.; .742 bu.; .443 lb.; .506 pk.; .246 ft.; .284 in.; .505 A.; .456 pwt.; 350 gr.; 8.76 oz.; 52.3 lb.; .482 cwt.; 38.5 yd.; .665 da.

Tell a short way of multiplying a decimal by 10; by 100; by 1000.

1. At \$2.12 a yard, how much will 10 yd. of silk cost?  $10\frac{1}{2}$  yd.?

2. How many feet are there in 1 rd.? How many feet are there in 10 rd.? in 100 rd.?

3. I borrowed \$25 and returned \$15.60. How much remained unpaid?

4. A wagon costs \$120, and a horse  $.33\frac{1}{3}$  of it. How much does the horse cost?

5. At  $\$ \frac{2}{3}$  a yard, how much will  $\frac{1}{8}$  yd. of linen cost?

Rapidly add:

66	56	90	80	48	76	48	42	67	94	50	65	80	66	91
19	12	19	15	12	18	16	14	29	17	14	23	15	14	19
12	25	15	14	14	19	18	18	15	13	19	13	19	17	20

6. I pay \$.12 $\frac{1}{2}$  for a yard of muslin. How much must I pay for 10 yd.? for 100 yd.?

7. If 4 bbl. of flour cost \$24, how much will .25 bbl. cost?

8. A boy sold  $\frac{1}{5}$  of his marbles to one boy and  $\frac{1}{2}$  of the remainder to another. What part of his marbles had he left?

9. I own  $\frac{3}{4}$  of a farm and sell  $\frac{1}{4}$  of my share. What part of the farm do I sell? What part remains?

10. I paid 12 ¢ for  $1\frac{1}{2}$  lb. sugar. How much was that a pound?

**Written.**

1. Reduce  $\frac{81}{125}$  to a decimal;  $\frac{141}{400}$  to a decimal.
2. Change .045 to a common fraction;  $.08\frac{3}{4}$  to a common fraction.
3. Add seven thousand and four thousandths, eight hundred ninety-seven and fifty-three hundred-thousandths, eighty-nine millionths, thirty-three ten-thousandths, four hundred and five thousandths, four hundred five thousandths, one thousand six hundred ninety-two and five tenths.
4. From  $.6\frac{1}{3}$  take  $.02\frac{1}{4}$ .
5. How much sugar can be bought for \$46.75, if  $\frac{3}{4}$  of 100 lb. cost \$6 $\frac{3}{8}$ ?

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6. Reduce  $\frac{43}{88}$  to a decimal of four places;  $\frac{3}{75}$  to hundredths.
7. Change .5625 to a common fraction;  $.062\frac{1}{2}$  to a common fraction.
8. A man owning  $\frac{1}{5}$  of 156 $\frac{2}{3}$  A., sold  $\frac{1}{3}$  of  $\frac{3}{4}$  of his share. How many acres did he sell? What was the value of the remainder at \$42 $\frac{1}{2}$  per acre?
9. Find the sum (in decimal form) of  $3\frac{1}{4}$ ,  $2\frac{1}{4}$ ,  $8\frac{7}{8}$ , and  $\frac{3}{16}$ ; of  $5\frac{5}{8}$ ,  $4\frac{1}{8}$ ,  $7\frac{3}{8}$ , and  $3\frac{1}{12}$ .
10. What is the sum of  $35\frac{3}{4}$  and  $23\frac{5}{8}$  minus  $8\frac{1}{2}$ ? What is the difference between  $75\frac{5}{8}$  and  $18\frac{1}{16}$ ?

**XLII****Oral.**

Rapidly subtract :

66	56	66	41	90	67	80	80	50	94	67	60	41	84	42
19	39	47	25	19	48	15	65	14	76	19	48	16	67	29

Rapidly divide the following by 10 ; by 100 ; by 1000 :

327 ft. ; 506 bu. ; 825 rd. ; 340 yd. ; 761 da. ; 915 gal. ;  
 284 qt. ; 473 yd. ; 800 A. ; 456 pk. ; 87.6 in. ; 56.2 hr. ;  
 3.85 pt. ; 4.56 gi. ; 84.3 bu. ; 7.82 pwt. ; 5.23 cwt. ;  
 42.9 T.

Tell a short way of dividing a whole number or a decimal by 10 ; by 100 ; by 1000.

1. I paid \$25 for 10 yd. of lace. How much did I pay for a yard ? for 12 yd. ?

2. If a man builds 812.5 rd. of fence in 100 da., how many rods does he build in 1 da. ?

3. A man travels  $\frac{1}{6}$  of his journey on horseback,  $\frac{1}{4}$  on foot, and the rest in a carriage. How far does he travel in a carriage ?

4. A man travels  $\frac{1}{8}$  of his journey on the first day,  $\frac{1}{4}$  of it on the second day, and  $\frac{1}{6}$  of it on the third day. What part of his journey does he travel on the fourth day in order to reach his destination ?

5. How many thousandths are there in  $4\frac{5}{8}$  ?

Rapidly subtract :

46	99	35	99	87	65	78	88	89	62	76	38	34	97	82
26	63	15	62	75	11	31	51	44	38	49	22	26	19	38

6. If a bag of oats containing 100 bu. costs \$60, what is the average price per bushel?

7. If a horse eats  $\frac{1}{4}$  of a bushel of oats in a day, how long should 17 bu. last?

8. How much will 2 hams, one weighing 8 lb. 8 oz. and the other 7 lb. 8 oz., cost at 25¢ a pound?

9. If 6 men can do a piece of work in 25 da., how long will it take one man to do it?

10. If a train travels  $7\frac{1}{2}$  mi. in a quarter of an hour, how far will it travel in 5 hr.?

**Written.**

1. Divide .688 by 42; .0126 by 18; .0032 by 16.

2. A boat goes at the rate of 17 mi. per hour. In how many hours will it go 65.25 mi.?

3. Divide 8765 by 1000; 87.65 by 100; 5687 by 2000; 34.72 by 200.

4. How much will 5 T. of iron cost at the rate of 46 T. for \$3461.50?

5. Find the cost of 1 lb. of butter at the rate of 2500 lb. for \$625.

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6. Divide .084 by 8;  $17\frac{1}{2}$  by 1000; 1184 by 32.

7. Find the price of 1 A. of land at the rate of 100 A. for \$3156 $\frac{1}{2}$ .

8. How much will 1 lb. of sugar cost at the rate of 396 lb. for \$31.68?

9. If 125 bu. of potatoes cost \$82 $\frac{1}{2}$ , how many barrels, each containing 2 $\frac{1}{2}$  bu., can be bought for \$224.40?

10. Find the value of  $1.12 \times 5 + 14$ .

**XLIII****Oral.**

Rapidly multiply :

400	600	1500	3500	170	150	180	15.0	1.6	1.06	1.006
<u>300</u>	<u>200</u>	<u>200</u>	<u>20</u>	<u>40</u>	<u>60</u>	<u>30</u>	<u>20</u>	<u>8</u>	<u>8</u>	<u>8</u>

$8 + 4 = ?$     $80 + 40 = ?$     $800 + 400 = ?$     $8000 + 4000 = ?$   
 $27 + 3 = ?$     $270 + 30 = ?$     $2700 + 300 = ?$     $27000 + 3000 = ?$

How is the quotient affected when we multiply both divisor and dividend by 10 ? by 100 ? by 1000 ?

What is the effect on the quotient of multiplying both divisor and dividend by the same number ? Illustrate : Why does  $6 \div .3$  equal  $60 \div 3$  ? Why does  $6 \div .12$  equal  $600 \div 12$  ? Why does  $6 \div .075$  equal  $6000 \div 75$  ?  
 $144 \div .12 = 14400 \div ?$     $948 \div 2.37 = ? \div 237$  ;    $210 \div 37.5 = 2100 \div ?$     $155 \div .05 = 15500 \div ?$     $155 \div .005 = ? \div 5$  ;  
 $456 \div .4 = 4560 \div ?$     $456 \div .04 = ? \div 4$ . (Give the reason for the answer in each example.)

1. At 8¢ a yard, how many yards of cloth can I buy for \$8 ? for \$80 ?

2. At 5¢ apiece, how many apples can I buy for \$60 ?

3. At  $3\frac{1}{2}$ ¢ a quart, how many quarts of milk must a farmer give for \$2.80 ?

4. At the cost of 25¢ a word for a cable message from New York to London, what is the cost of a 25-word message ?

5. James bought 8 bu. potatoes worth  $\$ \frac{3}{4}$  a bushel, and paid for them with eggs worth  $\$ \frac{2}{5}$  a dozen. How many eggs did he have ?

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Rapidly multiply :

17 85 96 72 32 46 48 72 14 32 48 64 16 15 45  
5 5 5 5 25 25 25 25 1.5 1.5 1.5 1.2 $\frac{1}{2}$  .37 $\frac{1}{2}$  .33 $\frac{1}{3}$  .66 $\frac{2}{3}$

$326 \div .014 = 326000 \div ?$   $45 \div .15 = 4500 \div ?$   $144 \div .012 = ? \div 12$ ;  $75 \div .5 = 750 \div ?$   $325 \div .016 = ? \div 16$ ;  $56 \div .75 = ? \div 75$ ;  $87 \div .3 = ? \div 3$ ;  $56 \div .4 = ? \div 4$ ;  $56 \div .04 = ? \div 4$ ;  $56 \div .004 = ? \div 4$ .

6. At 15¢ a peck, how many pecks of popcorn can be bought for \$3.75?

7. At 6¢ a yard, how many yards of muslin can I buy for \$15?

8. How many times is  $\frac{2}{3}$  contained in 4?

9. How long will it take to earn \$4 $\frac{1}{2}$ , at the rate of \$6 a week of six working days?

10. If a yard of cloth costs \$ $\frac{3}{8}$ , how many yards can I buy for \$12?

Written.

1. Divide 624 by .6; 1242 by .27; 3475 by .025.

2. A farmer sold 120 bu. rye at \$1.125 a bushel for which he received 27 bbl. flour. How much did the flour cost him a barrel?

3. If 35 yd. of cloth cost \$122.50, how much will 29 yd. cost?

4. Divide \$26.64 by 8; 17.6 by 44.

5. Divide 3.864 by 420.

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6. If 4.75 yd. of cloth are required for a coat, how many coats can be made from 1128 yd. of cloth?

7. Divide 5 by .25; 25 by .005; 400 by .008.
8. How many pounds of rice at \$.06 a pound are equivalent to 27 bbl. of flour at \$7.50 a barrel?
9. Find the value of  $3.4 \times 3.4 \times .7854$ .
10. Divide 125 by 2480; 2.25 by 9; 9520 by .7.

## XLIV

## Oral.

Rapidly find the quotient:

60 ÷ 20; 60 ÷ 2; 90 ÷ 30; 90 ÷ 3; 80 ÷ 40; 80 ÷ 4;  
 80 ÷ 20; 80 ÷ 2;  $20 \div \frac{1}{2}$ ;  $30 \div \frac{1}{2}$ ;  $40 \div \frac{1}{2}$ ;  $10 \div \frac{1}{4}$ ;  $20 \div \frac{1}{4}$ ;  
 $10 \div \frac{1}{8}$ ;  $20 \div \frac{1}{8}$ ;  $30 \div \frac{1}{4}$ ; 40 ÷ 20; 40 ÷ 2; 100 ÷ 25;  
 100 ÷ .25;  $100 \div \frac{1}{4}$ ; 50 ÷ .5;  $50 \div \frac{1}{2}$ ;  $25 \div \frac{1}{2}$ ; 4.2 ÷ 1.2  
 = 42 ÷ 12; Why? 4.2 ÷ .12 = 420 ÷ 12; Why? ? ÷ .012  
 = 4200 ÷ 12; Why? .42 ÷ 1.2 = ? ÷ 12; .42 ÷ .12 = ? ÷  
 12; .42 ÷ .012 = ? ÷ 12; .042 ÷ 1.2 = ? ÷ 12; .042 ÷ .12  
 = ? ÷ 12; .042 ÷ .012 = ? ÷ 12.

1. If .8 of a number is 40, what is the number?
2. If .75 of a number is 30, what is .8 of it?
3. I paid \$1.20 for .6 of a yard of cloth. How much was that a yard?
4. What is the sum of  $\frac{1}{18}$  and .002?
5. Reduce  $\frac{1}{2}\frac{7}{8}$  to a decimal.

Rapidly divide the numerator by the denominator:

$\frac{48}{6}$ ;  $\frac{4.8}{6}$ ;  $\frac{.048}{.6}$ ;  $\frac{4.8}{.06}$ ;  $\frac{4.8}{.006}$ ;  $\frac{48}{.006}$ ;  $\frac{27}{3}$ ;  $\frac{27}{.3}$ ;  $\frac{2.7}{3}$ ;  $\frac{2.7}{.3}$ ;  
 $\frac{2.7}{.03}$ ;  $\frac{.27}{.03}$ ;  $\frac{.027}{3}$ ;  $\frac{.027}{.3}$ ;  $\frac{.027}{.03}$ ;  $\frac{.027}{.003}$ ;  $\frac{45}{9}$ ;  $\frac{45}{.9}$ ;  $\frac{4.5}{9}$ ;  $\frac{4.5}{.9}$ .

6. Divide .12 by .2.



7. If .25 of a yard costs 24¢, what is the price of 1 yd.?

8. Divide .025 by 2.5.

9.  $\frac{.36}{.6} \times 5\frac{1}{2} = ?$

10. What is .25 of .003?

**Written.**

1. At \$2.32 a yard, how many yards can be bought for \$373.84?

2. The dividend being  $16\frac{1}{4}$  and the divisor .125, find the quotient.

3. Divide 7.5 by 15; .007 by 3500; 2.5 by .00025; 3.75 by .0075.

4. A farmer, having a flock of 120 sheep, sold 30; dogs killed  $\frac{1}{3}$  of the remainder. What part of the original number remained? How many hundredths of the original number remained?

5. How much will 22840 railroad ties cost at \$174.55 a M?

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6. Divide 1.4 by .007; 14.2 by .018; .06 by .0075. .006 by .0075; .006 by .75.

7. How many acres of land can be bought for \$1275 $\frac{1}{4}$  at \$80 $\frac{1}{4}$  per acre?

8. Divide .5 by .000025; 2.4 by .0006; 4.8 by 48000; .095 by 9500.

9. What is the cost of 9 $\frac{3}{4}$  cd. of wood at the rate of \$12.60 for 2.8 cd.?

10. From 3.5 $\frac{2}{3}$  take .65 $\frac{5}{7}$ .

## XLV

## Oral.

Rapidly add :

276	338	274	347	264	346	574	286	275	346	427
<u>124</u>	<u>152</u>	<u>136</u>	<u>138</u>	<u>171</u>	<u>138</u>	<u>238</u>	<u>265</u>	<u>238</u>	<u>265</u>	<u>384</u>

How many grains are there in 1 pwt.? A pennyweight is what part of an ounce? How many ounces are there in a pound Troy? An ounce Troy is what decimal part of a pound Troy? How many pennyweights are there in a pound? How many grains are there in a pound? For what is Troy weight used? Repeat the table of Troy weight.

1. How much will a nugget of gold weighing 6 oz. be worth at \$1 a pennyweight?

2. If 10 pwt. of silver are worth 3 shillings, what is the value of 3 lb. of silver?

3. What is the l. c. m. of 5, 10, 20, 25, and 50? Of what use is the l. c. m. of several numbers?

4. At  $12\frac{1}{2}$ ¢ a yard, how many yards can be bought for \$3?

5.  $\frac{3}{4}$  of a yard + 12 in. = how many inches?

Rapidly add :

278	256	872	543	942	357	602	846	435	642	458
<u>168</u>	<u>134</u>	<u>246</u>	<u>138</u>	<u>123</u>	<u>238</u>	<u>413</u>	<u>422</u>	<u>213</u>	<u>187</u>	<u>248</u>

6. How many grains are there in 4 pwt.? in 6 pwt.?

7. How many pennyweights are there in 72 gr.? in 96 gr.?

8. What is the value of 3 oz. of gold, if 3 pwt. cost \$3?

9. I sold  $3\frac{1}{2}$  yd. of silk and  $2\frac{3}{4}$  yd. of velvet. How many yards in all did I sell?

10. How much will 56 yd. of lace cost at  $12\frac{1}{2}$ ¢ a yard?

Written.

1. Simplify  $21.6 + .039 + .5$ .

2. The divisor being 6 and the dividend .03, what is the quotient?

3. What part of  $\frac{4}{5}$  is  $\frac{2}{3}$ ? of .75 is .3?

4. If 2.5 yd. cost \$7 $\frac{1}{2}$ , how many yards can be bought for \$2.25?

5. From a piece of muslin containing 136 yd., 17 yd. were cut. What part of the piece remained? How many hundredths remained?

6. Divide 8.968 by 5900.

7. What part of  $6\frac{1}{2}$  is  $3\frac{3}{4}$ ?

8. A grocer had 150 lb. of butter. He sold  $22\frac{1}{2}$  lb. What part did he have left?

9. If I pay \$294 for 490 yd. of taffeta silk and I sell it for 95¢ a yard, how much do I gain?

10. What part of 605 is  $27\frac{1}{2}$ ?

### XLVI

Oral.

Rapidly reduce to simplest form:

$$\frac{21 \times 24}{8}$$

$$\frac{13 \times 25}{39}$$

$$\frac{3 \times 69}{23}$$

$$\frac{31 \times 84}{42}$$

$$\frac{45 \times 3}{15}$$

$$\frac{27 \times 12}{9}$$

$$\frac{11 \times 48}{16}$$

$$\frac{42 \times 5}{6}$$

$$\frac{48 \times 2}{24}$$

$$\frac{15 \times 49}{60}$$

$$\frac{17 \times 4}{12} \quad \frac{56 \times 7}{28} \quad \frac{64 \times 4}{16} \quad \frac{81 \times 5}{27} \quad \frac{48 \times 24}{6} \quad \frac{75 \times 15}{25}$$

What subdivisions of the ounce does the apothecary or druggist use in weighing medicine?

How many grains are there in a scruple? in 3  $\text{D}$ ?

How many scruples are there in a dram? in 4  $\text{z}$ ?

How many drams are there in 120 gr.? in 36  $\text{D}$ ?

How many ounces are there in a pound (apothecaries' weight)? in 5 lb. (apothecaries' weight)? For what is apothecaries' weight used? By what weight do druggists sell medicines in quantity?

1. If 5 gr. of medicine cost 10¢, how much will 3  $\text{D}$  and 4  $\text{z}$  cost?

2. If two thirds of 9  $\text{D}$  of a certain drug cost 18¢, how much will 1  $\text{D}$  cost? How much will 1  $\text{z}$  cost?

3. What is the l. c. m. of 2, 3, 5, 9, and 10? What use can be made of the l. c. m. of several numbers?

4. What is  $\frac{2}{3}$  of 66?  $\frac{4}{5}$  of 100?  $\frac{5}{8}$  of 120?  $186 \times \frac{5}{8}$ ?  $80 \times \frac{3}{4}$ ?

5. Add  $2\frac{1}{2}$  and  $1\frac{1}{3}$ .

Rapidly reduce to simplest form:

$$\begin{array}{ccccc} \frac{5 \times 47}{25} & \frac{49 \times 8}{7} & \frac{6 \times 36}{24} & \frac{31 \times 96}{93} & \frac{16 \times 8}{64} \\ \frac{24 \times 37}{72} & \frac{39 \times 15}{13} & \frac{100 \times 80}{25} & \frac{40 \times 8}{24} & \frac{22 \times 15}{88} \\ \frac{17 \times 20}{68} & \frac{14 \times 32}{84} & \frac{51 \times 33}{17} & \frac{27 \times 45}{81} & \frac{33 \times 25}{11} \end{array}$$

How many ounces are there in a pound, apothecaries' weight? in a pound, Troy? How many grains are there in a pound, apothecaries' weight? in a pound, Troy? How is the ounce subdivided in apothecaries' weight? How is the ounce subdivided in Troy weight? What is the only difference between Troy weight and apothecaries' weight? Repeat each table.

6. How many drams are there in 120 gr.?

7. How many pellets can a druggist make from a mixture of medicine containing 2  $\text{D}$  of one kind and 2  $\text{3}$  of another, if each pellet contains 5 gr.?

8. How much will 48 yd. of carpet cost at  $\$1.12\frac{1}{2}$  a yard?

9. At  $\$1.12\frac{1}{2}$  a bushel, how much will 72 bu. of wheat cost?

10. 25 is  $\frac{5}{8}$  of 5 times what number?

### Written.

1. From the sum of  $\frac{5}{6}$  and  $\frac{3}{4}$  take their difference.

2. From a cask containing  $45\frac{1}{2}$  gal. of sirup a grocer sold to one customer  $16\frac{3}{4}$  gal. and to another  $21\frac{3}{8}$  gal. How many gallons remained unsold, and what was its value at 35¢ a quart?

3. A jeweler has 9 diamonds which weigh respectively:  $\frac{3}{4}$ ,  $\frac{5}{8}$ ,  $\frac{9}{16}$ ,  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{7}{8}$ ,  $\frac{4}{16}$ ,  $\frac{1}{32}$  carats. What is their total weight?

4. A dealer sells  $1\frac{1}{4}$  gross,  $3\frac{7}{8}$  gross, and  $8\frac{3}{4}$  gross of lead pencils at 36¢ per dozen. How much does he receive for all these pencils?

5. What is the cost of  $2\frac{2}{3}$  T. of hay if  $3\frac{1}{5}$  T. cost \$48?

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6. What is the sum of 28.7, 175.28, .037, 25.0045, and 4.08?

7. Mr. Brown is 51 yr. old, and his son is 17 yr. old. What part of the father's age is the son's? How many hundredths of the father's age is the son's?

8. If  $\frac{9}{16}$  of the value of a ship is \$8280, what is the whole value?

9. A farmer sold a horse for \$140, which was  $\frac{7}{16}$  of what he paid for it. How much did it cost him? How much did he lose?

10. The dividend being 48.45 and the divisor .089, find the quotient.

### XLVII

#### Oral.

Rapidly multiply :

16 by .125; 24 by .375; 32 by .625; 48 by .875; 16 by 1.25; 24 by 3.75; 32 by 6.25; 18 by  $.33\frac{1}{3}$ ; 27 by  $.66\frac{2}{3}$ ; 120 by .20; 150 by .40; 160 by .80.

Read: 654.15; .000209; 60.02007; 684.007; 200.0035; .0025; 78.0078; 70000.007; 70.007; 56.000084; 19.0025.

Read as hundredths: .01; .055; .0025; 1.07; .00125; .025; .05375.

1. If 3 qt. 1 pt. of oil cost 7¢, how much will 1 gal. 1 pt. cost at the same rate?

2. I divided .75 lb. of candy among 3 girls. What part of a pound did each receive?

3. At 75¢ each, how many chairs can be bought for \$12?

4. I spent \$2.50, which was .5 of my money. How much money had I?

5. A collector receives .05 of all the money he collects. How much money must he collect to earn \$15?

---

Rapidly multiply:

80 by .60; 14 by  $.14\frac{2}{3}$ ; 28 by  $.28\frac{4}{7}$ ; 24 by  $.16\frac{2}{3}$ ; 64 by  $.06\frac{1}{4}$ ; 36 by  $.08\frac{1}{3}$ ; 24 by  $.83\frac{1}{3}$ ; 56 by  $.12\frac{1}{2}$ ; 32 by  $.37\frac{1}{2}$ ; 48 by  $.62\frac{1}{2}$ ; 64 by  $.87\frac{1}{2}$ ; 57 by  $.33\frac{1}{3}$ .

Read: 40.002; 32.0004; 56.0042; .000018; 87.5; 56.875; .00402.

Read as hundredths: .005; .0075; .0525; .67875; .00125; .125.

6. If  $\frac{3}{4}$  of a yard costs \$ $\frac{7}{8}$ , how much will 1 yd. cost?

7. A man earned \$75 and saved \$20. What part of his money did he save?

8. I have 3 quires of paper for 70 boys. How many sheets more will be needed, so that each boy may have 1 sheet of paper?

9. How many books are there in a library in which there are 18 shelves containing an average of 20 books each?

10. How many books at 75¢ each can be bought for \$9?

Written.

1. I bought 50 quires of paper at \$1 a quire, and sold it for \$.05 a sheet. How much did I gain?

2. Take 899.90785 from 918.069.

3. The dividend being 855 and the quotient  $47\frac{1}{2}$ , what is the divisor?

4. From nine take nine thousandths, and multiply the remainder by one and two tenths.

5. The product of two numbers is 1.262; one of the numbers is 9.7. What is the other number?

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6. At \$18.75 apiece, how many stoves can be bought for \$506.25?

7. A friend has \$75, which is  $\frac{3}{8}$  of what I have. How much money have I?

8. A piece of land which is 130 rd. wide has an area of 24195.7 sq. rd. How long is it?

9.  $(\frac{2}{3} \text{ of } \frac{3}{4} \text{ of } 14) - \frac{1}{2} = ?$

10. Multiply 6.018 by 9.08.

### XLVIII

Oral.

Rapidly divide:

$$\begin{array}{cccccc}
 7 \overline{)84} & 7 \overline{)8.4} & 7 \overline{).84} & .7 \overline{)84} & .7 \overline{)8.4} & .7 \overline{).84} \\
 .07 \overline{)84} & .07 \overline{)8.4} & .07 \overline{).84} & .7 \overline{)18.9} & .5 \overline{)3.25} & .06 \overline{)3.6} \\
 .4 \overline{).64} & 60 \overline{)3.6} & 60 \overline{).48} & 50 \overline{)125} & 200 \overline{)425} & 200 \overline{)4.25}
 \end{array}$$

Count by 8's from 26 to 114. Count by 7's from 27 to 118.

1. Divide 6.4 by .02.

2. If .12 of a yard costs \$1.20, what is the price of 1 yd.?

3. 4.5 is .25 times what number?

4. 16.8 is 2.1 times what number?

5. 7.5 is .03 of what number?



Rapidly divide:

$$\begin{array}{cccccc}
 .2 \overline{)4.08} & .125 \overline{)25} & .004 \overline{)2.4} & 40 \overline{)24} & 40 \overline{)2.4} & \\
 40 \overline{).24} & 80 \overline{).048} & 600 \overline{)2.4} & .06 \overline{)2.4} & .4 \overline{).024} & \\
 .6 \overline{).0048} & 70 \overline{)4.90} & 5 \overline{)24.5} & .4 \overline{)3.12} & .3 \overline{)29.1} & \\
 3 \overline{).141} & 4 \overline{)11.6} & .6 \overline{).378} & .5 \overline{)2.95} & .9 \overline{)38.7} & 
 \end{array}$$

Count by 6's from 27 to 111. Count by 9's from 13 to 112.

6. The dividend being .02 and the divisor 40, find the quotient.

7. How much will .5 of a yard cost at  $7\frac{1}{2}$  ¢ a yard?

8. The dividend being  $3\frac{1}{2}$  and the divisor .07, find the quotient.

9. If .03 of an acre costs \$15, how much does an acre cost?

10. What common fraction is equal to the difference between  $.07\frac{1}{2}$  and  $\frac{1}{8}$ ?

Written.

$$1. \frac{20 \times 2 \times 6 \times 16}{12 \times 8} = ? \quad \frac{36 \times 27 \times 24}{9 \times 4 \times 6} = ? \quad \frac{18 \times 19 \times 17}{85 \times 57} = ?$$

2. A farmer exchanges 81 cd. of wood at \$5 per cord for cows worth \$27 apiece. How many cows does he get?

3. How many flour barrels at 40 ¢ each will pay for 112 bu. of corn at 70 ¢ a bushel?

$$4. (1.008 \div 18 + \overline{63} + 4000 \times 100) - \frac{4}{5} = ?$$

5. What is the area in square feet of a rectangle 427.5 ft. long and 217.8 ft. wide?

---

$$6. \frac{25 \times 16 \times 7}{14 \times 12} = ? \quad \frac{68 \times 72 \times 96}{24 \times 17 \times 11} = ? \quad \frac{13 \times 15 \times 12}{68 \times 60} = ?$$

7. How many bales of cloth, each containing 40 pieces, and each piece containing 36 yd., worth \$3 a yard, must be given for 120 horses worth \$108 each?

$$8. (\overline{.48 + 800 \times 10000 + 6.4 + .08}) + 125 = ?$$

9. Find the cost of 850 ft. of plank at \$1.94 per C, and 1250 fence pickets at \$12½ per M.

10. Find the area in square yards of a room 38.5 ft. long and 28.7 ft. wide.

### XLIX

#### Oral.

Rapidly find the area of the following parallelograms :

12 ft. by 12 ft. ; 30 yd. by 20 yd. ; 40 rd. by 40 rd. ; 35 ft. by 8 ft. ; 25 rd. by 20 rd. ; 17 yd. by 4 yd. ; 80 rd. by 60 rd. ; 50 ft. by 30 ft. ; 25 yd. square ; 80 rd. square ; 60 yd. square ; 30 ft. by 27 ft.

Draw a square and one diagonal of it. If the square measures 8 ft. in length, how much does it measure in width? What is the area of a square that measures 8 ft. on a side? How does the diagonal that you have drawn divide the square? How many square feet are there in the area of ½ the square? What kind of angles are formed within a square? What kind of triangle is formed by drawing the diagonal of a square? How many triangles result from drawing a diagonal of a square? What relation do the triangles bear to each other with regard to size? What relation does each triangle bear to the square with regard to size? If the area of a square is 620 sq. ft.,

what will be the area of one of the triangles formed by drawing a diagonal? If the area of a right-angled triangle is 80 sq. yd., what will be the area of a square of which it is a part? If a square measures 12 in. on a side, what will be its area in square inches? What will be the area of a right-angled triangle the base of which is 12 in. long?

Draw a rectangle the sides of which are to each other as 3 is to 1. Suppose the base is 12 in. and the altitude 4 in., what is the area of the rectangle in square inches? What is the area of one of the triangles formed by drawing a diagonal? What kind of triangles result from drawing the diagonal of a rectangle? How is the area of each triangle found? If the area of a rectangle is 72 sq. ft., what is the area of one of the triangles formed by drawing a diagonal? How is the area of a right-angled triangle found if the length of the sides is known? How is the area of a right-angled triangle found when the base, or length, and the height, or altitude, are given?

1. Find the area in square feet of a right-angled triangle the base of which is 24 ft. and altitude 4 ft.
  2. What is the area in square feet of a right-angled triangle having a base of 30 ft. and a height of 20 ft.?
  3. What is the area in square yards of a right-angled triangle having a base of 30 ft. and altitude of 6 ft.?
  4. What will be the cost of plastering a wall 60 ft. long and 30 ft. wide, at \$.25 a square yard?
  5. How much will it cost to fence a field 40 rd. square at \$1.25 a rod?
-

Rapidly find the area in square yards of parallelograms having the following dimensions :

30 yd. by 18 yd. ; 30 ft. by 18 ft. ; 30 ft. by 27 ft. ;  
20 yd. by 18 yd. ; 20 ft. by 18 ft. ; 30 yd. square ; 30 ft.  
square ; 60 yd. by 30 yd. ; 60 ft. by 30 ft. ; 15 ft. square ;  
100 ft. by 9 ft. ; 16 yd. by 5 yd.

6. What is the area in square feet of a right-angled triangle the base of which is 7 ft. and the altitude 9 ft. ?

7. Find the area in square inches of a right-angled triangle the base of which is 12 in. and the altitude  $4\frac{1}{2}$  in.

8. How many square yards are there in a right-angled triangle the base of which is 9 ft. and the altitude 12 ft. ?

9. How much will it cost to carpet a room 30 ft. square at \$1.50 a square yard ?

10. Find the cost of fencing a field 40 rd. long by 20 rd. wide at \$.75 a rod.

### Written.

1. What is the area in square feet of a right-angled triangle whose base is 24 ft. and altitude 14 ft. ?

2. How many acres are there in a piece of ground in the shape of a right-angled triangle the base of which is 80 rd. and altitude 40 rd. ? \*

3. A city lot in the shape of a right-angled triangle has a base of 82 ft. and an altitude of  $25\frac{1}{2}$  ft. What is the value of the lot at \$5.50 a square foot ?

4. How many acres are there in a rectangular field 145 rd. long and 86 rd. wide ?

\* SUGGESTION :  $\frac{80 \times 40}{2} \times \frac{1}{160} = \text{area in acres.}$

5. Find the area of a right-angled triangle, the base of which is 18.75 in. and altitude 14.875 in.

6. What is the area in square rods of a right-angled triangle the base of which is 5 rd. and altitude 12.2 rd.?

7. What is the area in square yards of a right-angled triangle, the base of which is 30 ft. and altitude 27 ft.?

8. Draw to a scale of  $\frac{1}{2}$  in. to a rod a diagram of a right-angled triangle the base of which is 12 rd. and altitude 6 rd. Find its area in square rods.

9. The length of a rectangle is 80 rd. The length of its perimeter is 220 rd. What is the width of the rectangle? What is its area in square rods? Draw a diagram, scale 1 in. = 20 rd.

10. At 3¢ a square foot, how much will it cost to sod a lawn 2 rd. square?

## L

### Oral.

Rapidly make change from \$1:

85¢; 75¢; 13¢; 68¢; 35¢; 40¢; 56¢; 42¢; 37¢;  
58¢; 66¢; 87¢; 76¢; 23¢; 54¢; 46¢; 88¢; 94¢;  
53¢; 45¢; 39¢; 14¢; 12¢; 24¢; 36¢; 17¢; 27¢.

What is a right-angled triangle? How is the area of a right-angled triangle found?

1. Find the area in square rods of a right-angled triangle, the base of which is 5 rd. and the altitude of which is 12 rd.

2. How many square rods does a piece of land contain that is 80 rd. long and 20 rd. wide?

3. How many square yards does a room contain that is 20 ft. long and 18 ft. wide?

4. How much will it cost to put molding around the room of the dimensions mentioned in example 3 at 25¢ a foot?

5. 35 is  $\frac{5}{8}$  of what number? 27 is .375 of what number?

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Rapidly make change from \$2:

85¢; \$1.35; 48¢; 65¢; \$1.39; \$1.82; 56¢; 48¢; \$1.27; \$1.15; 98¢; 37¢; \$1.29; \$1.56; \$1.23; 88¢; 68¢; 18¢; 26¢; \$1.17; \$1.42; \$1.14; \$1.87; \$1.52.

6. A plot of ground in the form of a right-angled triangle has a base of 20 rd. and an altitude of 16 rd. How many acres are there in its area?

7. A field is 40 rd. long and 20 rd. wide. How many square rods does it contain? How many acres are there in the field?

8. How many acres are there in 1 sq. mi.? in  $\frac{1}{4}$  sq. mi.? in 10 sq. mi.?

9. How long will it take to walk  $\frac{5}{8}$  mi. at the rate of 3 mi. an hour?

10.  $\frac{5}{8}$  of 64 are  $\frac{4}{9}$  of 9 times what number?

**Written.**

1. A garden is 6 rd. long and 4 rd. wide. How many square rods are there in its area? How many square feet are there in its area?

2. How many acres are there in a rectangular-shaped farm which is 350 rd. long and 225 rd. wide?

3. How much will it cost to lay a cement walk  $85\frac{1}{2}$  ft. long and 6 ft. wide at  $16\frac{1}{2}$ ¢ a square foot?

4. What is the cost of making a playground 75 ft. long and 40 ft. wide at \$1.25 a square yard?

5. Simplify  $\frac{\frac{3}{8} + .3}{\frac{3}{8} - .3}$ .

---

6. A right-angled triangle has a base of 84 rd. and an altitude of 35 rd. What is its area in acres?

7. How many square feet are there in the floor of a garage 84 ft. long and 36 ft. wide?

8. A skating pond in the form of a rectangle contained  $\frac{1}{4}$  of an acre and was 4 rd. wide. How long was the pond?

9. A coal dealer bought a cargo of coal for \$472.75, and by selling it at \$8.50 a ton, he gained \$190.25. How many tons did he buy?

10. Simplify  $\frac{\frac{7}{8}}{.75} \times \frac{5}{\frac{1}{6}}$ .

## LI

### Oral.

Rapidly find the area in square yards of right-angled triangles having the following dimensions:

Base 18 ft., altitude 3 ft.      Base 12 yd., altitude 5 yd.

Base 4 yd., altitude 16 yd.      Base 60 ft., altitude 24 yd.

Base 9 yd., altitude 8 yd.      Base 24 yd., altitude 30 yd.

Base 15 ft., altitude 4 ft.      Base 30 ft., altitude 20 ft.

Base 12 ft., altitude 6 ft.      Base 40 ft., altitude 10 ft.

Base 4 yd., altitude 18 yd.      Base 6 yd., altitude 8 yd.

Base 36 ft., altitude 10 ft.      Base 3 ft., altitude 18 ft.

If a unit or a number is divided into 8 equal parts, how many eighths represent the whole number? If a number is divided into 5 equal parts, how many fifths represent the whole number? If a number is divided into 7 equal parts, what fraction represents the whole number? 6 equal parts? 9 equal parts? 4 equal parts?

If a number is divided into 5 equal parts and  $\frac{5}{8}$  represents the number, what fraction will represent  $\frac{1}{8}$  more than the number? Make a diagram representing a line plus  $\frac{1}{8}$  of itself. What fraction will represent  $\frac{2}{8}$  more than the number? What fraction will represent  $\frac{3}{8}$  more than the number? Make a diagram representing a line plus  $\frac{1}{8}$  of itself.

If a number is 24, what number will be  $\frac{1}{8}$  more? Twenty-seven is  $\frac{3}{8}$  of what number? Twenty-seven is  $\frac{1}{8}$  more than what number? If a number is 36, what number will be  $\frac{1}{8}$  more? Forty-two is  $\frac{7}{8}$  of what number? Forty-two is  $\frac{1}{8}$  more than what number? If a number is 35, what number will be  $\frac{2}{8}$  more? Forty-nine is  $\frac{7}{8}$  of what number? Forty-nine is  $\frac{2}{8}$  more than what number?

If 49 is  $\frac{2}{8}$  more than a certain number, how many fifths of that number is 49?

If 64 is  $\frac{3}{8}$  more than a certain number, how many fifths of that number is 64? What is the number?

1. Eighty-one is  $\frac{1}{8}$  more than what number?
2. Fifty-six is  $\frac{1}{8}$  more than what number?
3. My money increased by  $\frac{1}{8}$  of itself equals \$20. How much money have I?
4. There are forty-nine boys present in a class to-day, which is  $\frac{1}{8}$  more than were present yesterday. How many boys were present yesterday?



5. James gave 10¢ for a pie, which was  $\frac{2}{3}$  of  $\frac{1}{2}$  of what his supper cost him. How much did his supper cost?

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Rapidly find the areas in square yards of right-angled triangles having these dimensions :

Base 8 yd., altitude 4 yd. Base 9 yd., altitude 4 yd.  
 Base 5 ft., altitude 80 ft. Base 8 ft., altitude 9 ft.  
 Base 6 ft., altitude 100 ft. Base 16 yd., altitude 3 yd.  
 Base 30 yd., altitude 20 yd. Base 18 ft., altitude 10 ft.  
 Base 10 ft., altitude 30 ft. Base 32 yd., altitude 4 yd.  
 Base 24 ft., altitude 3 ft. Base 5 yd., altitude 16 yd.  
 Base 45 ft., altitude 2 ft. Base 8 yd., altitude 8 yd.  
 Base 100 yd., altitude 100 yd. Base 10 yd., altitude 5 yd.

6. Fifty-four is  $\frac{1}{8}$  more than what number?

7. A man's money increased by  $\frac{1}{6}$  of itself equals \$35. How much money has he?

8. A farmer bought  $\frac{3}{8}$  as many more cows as he had, and then found that he had 22. How many had he at first?

9. A boy lost 4 marbles and found 10 and then had  $\frac{3}{8}$  as many as at first. How many had he at first?

10.  $\frac{2}{3}$  of \$27 =  $\frac{3}{4}$  of how many dollars?

Written.

1. A certain number increased by  $\frac{5}{8}$  of itself equals 546. What is the number?

2. What number increased by  $\frac{3}{4}$  of itself will equal 2456 $\frac{1}{8}$ ?

3. A house was sold for \$9680, which was  $\frac{1}{4}$  more than it cost. How much did it cost?

4. 666 is  $\frac{4}{5}$  more than what number?

5. A man put  $21\frac{1}{2}$  bu. of oats into bags holding  $1\frac{1}{2}$  bu. each. How many bags did he use?

6. A number increased by  $\frac{3}{8}$  of itself equals 451. What is the number?

7. A farmer has 435 hens, which is  $\frac{2}{3}$  more than his neighbor has. How many hens has his neighbor?

8. When a number is increased by  $\frac{3}{8}$  of itself, the sum is 517. What is the number?

9. An agent sold a house for \$2160, which was  $\frac{1}{5}$  more than it cost. How much did it cost?

10. How many square yards are there in a square court 100 ft. on a side?

## LII

### Oral.

Rapidly add :

11	12	13	14	15	16	17	18	19	21	22	23	24	25	26
10	13	12	12	13	11	11	10	11	13	12	12	12	10	11
2	5	5	4	2	3	5	2	2	2	1	2	1	2	1

How much are 5 hundredths of a dollar? 7 hundredths? 8 hundredths? What other name is given to hundredths of a dollar? What is the literal or true meaning of the word *cent*? What does *per cent* mean? What does 5 per cent mean? 35 per cent mean? 85 per cent?

What is the difference between  $\frac{7}{100}$  and 7%? What is the sign % called?

Read the following as hundredths : 75 % ; .85 ; 125 % ; .25 ;  $\frac{1}{2}$  % ;  $\frac{1}{4}$  % ; .005 ; .0025 ; .12 $\frac{1}{2}$  ; 6 % ; 37 $\frac{1}{2}$  % ; 5 % ;  $\frac{1}{3}$  % ;  $\frac{1}{8}$  % ; .625.

In a certain school containing 1200 pupils, 5 out of every hundred of the pupils were absent. How many per cent were absent? How many pupils were absent?

One per cent of a number is what part of the number? Ten per cent of a number is how many hundredths of the number? What is 10 % of 600?

1. A boy gave away 6 marbles out of every hundred he had. How many did he give out of 500? What per cent did he give away?

2. A man who had 200 sheep sold 10 out of every hundred. How many sheep did he sell?

3. A farmer had 180 sheep and sold 20 % of them. How many did he sell?

4. Find 4 % of 100 ; 200 ; 500 ; 125 ; 150 ; 175.

5. What is .33 $\frac{1}{3}$  of \$4.80?

Rapidly add :

27	28	29	30	12	13	14	15	16	17	18	16	18	21	24
12	12	13	16	12	13	15	11	10	11	12	2	3	4	4
<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>4</u>	<u>16</u>	<u>18</u>	<u>21</u>	<u>24</u>

What per cent of a number is  $\frac{1}{100}$  of it?  $\frac{2}{100}$ ?  $\frac{3}{100}$ ?  $\frac{4}{100}$ ?  $\frac{5}{100}$ ?  $\frac{6}{100}$ ?  $\frac{8}{100}$ ?  $\frac{10}{100}$ ?  $\frac{25}{100}$ ?  $\frac{50}{100}$ ?  $\frac{75}{100}$ ?  $\frac{100}{100}$ ?

Twenty-five hundredths of a number is what fractional part of the number?

6. Find  $\frac{25}{100}$  of 24 ; 25 % of 36.

7. Find .75 of 48;  $\frac{25}{100}$  of 60; 50 % of 98.
8. Find .25 of 1600; add .45 of 1600 to 1600; find 1.50 of 1600.
9. 10 % of a class of 40 pupils were absent one day. How many pupils were present?
10. The dividend being .08 and the divisor 40, what is the quotient?

**Written.**

Write as a decimal and as a common fraction in lowest terms:

	dec. fr.	com. fr.					
25 %	= .25	= $\frac{1}{4}$	20 %	35 %	85 %	4 %	5 %
75 %			40 %	45 %	88 %	8 %	32 %
50 %			60 %	55 %	90 %	12 %	26 %
15 %			80 %	65 %	36 %	30 %	42 %

1. A man invested \$2000 in business and lost 40 % of it. How many dollars did he lose?
2. A man raised 560 chickens. He sold 40 % of them at \$3 a dozen. How much did he receive for the chickens he sold?
3. A lawyer having collected \$2460, charged a fee of 6 %. How much was his fee?
4. In a cargo of 360 bbl. of apples, 15 % were damaged. What was the value of the remainder at \$2.75 a barrel?
5. How much are some silver tablespoons that weigh 3 lb. 2 oz. worth, if silver is \$2.75 per ounce?
6. Find 84 % of 3276 mi.
7. I bought a house for \$5500 and sold it at a gain of 25 % of the cost. How much did I gain?

8. I sold a house for \$3500, which was  $\frac{1}{4}$  more than I paid for it. How much did it cost me? How much did I gain?

9. How much will a cask of sugar weighing 9 cwt. 58 lb. cost at  $6\frac{1}{4}$ ¢ a pound?

10.  $(\$262.64 + \$.56) \times .0084 + .024 \times 100 = ?$

### LIII

Oral.

Rapidly find:

$$\frac{12\frac{1}{2}}{100} \text{ of } \begin{cases} 56 \\ 84 \\ 96 \\ 72 \\ 120 \\ 200 \\ 360 \\ 480 \end{cases} \quad .16\frac{2}{3} \text{ of } \begin{cases} 60 \\ 72 \\ 84 \\ 96 \\ 120 \\ 360 \\ 480 \\ 960 \end{cases} \quad 8\frac{1}{2} \% \text{ of } \begin{cases} 24 \\ 48 \\ 96 \\ 84 \\ 120 \\ 360 \\ 480 \\ 960 \end{cases}$$

What fractional part of a number is 1% of it? 2%? 3%? 5%? 10%? 20%? 50%? 75%? 80%? 100%?

What per cent or how many hundredths of a number is  $\frac{1}{2}$  of it?  $\frac{1}{4}$  of it?  $\frac{3}{4}$ ?  $\frac{1}{3}$ ?  $\frac{2}{3}$ ?  $\frac{1}{6}$ ?  $\frac{5}{6}$ ?  $\frac{2}{5}$ ?  $\frac{3}{5}$ ?  $\frac{4}{5}$ ?  $\frac{1}{8}$ ?  $\frac{3}{8}$ ?  $\frac{5}{8}$ ?  $\frac{1}{7}$ ?  $\frac{2}{7}$ ?  $\frac{1}{9}$ ?  $\frac{1}{12}$ ?  $\frac{5}{12}$ ?

What is the process of computing by hundredths called? What is the meaning of per cent?

1. Find 20% of 80 bu. (Explain how to work this problem.)

2. Find  $16\frac{2}{3}$ % of 36 gal.

3. What are my expenses, if I earn \$800 a year and spend 30% of it?

4. Fifty-six is  $\frac{1}{7}$  more than what number?
5. 2.4 is .004 of what number?

Rapidly find :

- $12\frac{1}{2}\%$  of : 16; 24; 168; 48; 72; 88; 96; 248; 56; 32.  
 $50\%$  of : 8; 10; 14; 28; 80; 85; 126; 350; 720; 144.  
 $25\%$  of : 12; 20; 32; 44; 52; 80; 36; 88; 72; 84.  
 $33\frac{1}{3}\%$  of : 18; 21; 66; 72; 100; 96; 120; 54; 360; 24.

6. How many quarts are there in 25% of 2 gal.?
7. If I sell a horse for  $12\frac{1}{2}\%$  more than I paid for it, what fractional part do I gain?
8. .25 is .125 of what number?
9.  $\frac{1}{5}$  is what decimal part of  $\frac{9}{10}$ ?
10.  $\frac{2}{3}$  is what decimal part of  $\frac{3}{4}$ ?

Written.

1. Write each of the following, first as a decimal, and then as a common fraction in lowest terms:  $12\frac{1}{2}\%$ ;  $16\frac{2}{3}\%$ ;  $8\frac{1}{3}\%$ ;  $33\frac{1}{3}\%$ ;  $66\frac{2}{3}\%$ ;  $87\frac{1}{2}\%$ ;  $62\frac{1}{2}\%$ ;  $37\frac{1}{2}\%$ ;  $83\frac{1}{3}\%$ ;  $14\frac{2}{3}\%$ .
2. A farmer raised 1680 bu. of wheat and sold  $33\frac{1}{3}\%$  of them at 80¢ a bushel. How much did he receive for what he sold?
3. Eighty per cent of a class of 55 pupils were promoted. How many pupils were left back?
4. I bought a house for \$3500 and paid 15% of the money in cash. How much remains to be paid?
5.  $\frac{5}{8}$  being the minuend and  $\frac{2}{5}$  the remainder, what is the subtrahend?

6. A man receiving a salary of \$1250 a year had it increased 8 %. How much was his salary then?
7. A grain dealer bought 4380 bu. of grain and sold 45 % of it. How much did he sell?
8. Reduce  $\frac{16}{17}$  to a decimal of four places.
9. Reduce .064 to a common fraction in its lowest terms.
10. If \$21 will buy  $3\frac{1}{2}$  cd. of wood, how many cords can be bought for \$16 $\frac{1}{2}$ ?

### LIV

#### Oral.

Rapidly find :

$12\frac{1}{2}\%$  of  $\frac{2}{3}$ ;  $33\frac{1}{3}\%$  of  $\frac{2}{3}$ ;  $16\frac{2}{3}\%$  of  $\frac{1}{2}$ ;  $66\frac{2}{3}\%$  of  $\frac{1}{3}$ ;  
 $37\frac{1}{2}\%$  of  $\frac{8}{9}$ ;  $8\frac{1}{3}\%$  of  $\frac{4}{5}$ ;  $.66\frac{2}{3}$  of  $\frac{8}{9}$ ;  $.62\frac{1}{2}$  of  $\frac{2}{3}$ ;  $62\frac{1}{2}\%$  of  $\frac{2}{3}$ ;  
 $14\frac{2}{7}\%$  of  $\frac{1}{5}$ .

Finding  $\frac{2}{3}$  of a number is the same as finding what per cent of it?

Finding  $\frac{3}{4}$  of a number is the same as finding how many hundredths of it?  $\frac{1}{8}$  of a thing is what per cent of it?  $\frac{3}{8}$  = how many hundredths?

$\frac{1}{8}$  = what per cent?  $\frac{1}{12}$  = how many hundredths?  $\frac{1}{18}$  = what per cent?

Finding  $.83\frac{1}{3}$  of a number is the same as finding what per cent of it? What fractional part of it? What is meant by per cent?

1. A boy earned 40¢ and spent  $12\frac{1}{2}\%$  of it. How much was left?
2. Seventy-five per cent of a yard is how many inches?
3. How many pounds are there in 75 % of a ton?

4. The divisor being 60 and the dividend .03, what is the quotient?

5. How many grains are there in an ounce Troy?  
Sixty grains is what decimal part of an ounce Troy?

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Rapidly find :

$16\frac{2}{3}\%$  of:  $\frac{1}{2}; \frac{1}{4}; \frac{1}{3}; \frac{2}{3}; \frac{3}{4}; \frac{1}{5}; \frac{2}{5}; \frac{4}{5}; \frac{1}{8}; \frac{3}{8}; \frac{5}{8}; \frac{1}{6};$   
 $\frac{1}{7}; \frac{2}{7}; \frac{5}{8}; \frac{7}{8}; \frac{1}{9}; \frac{2}{9}; \frac{4}{9}.$   
 $33\frac{1}{3}\%$  of:  $\frac{1}{3}; \frac{1}{6}; \frac{1}{9}; \frac{2}{3}; \frac{1}{4}; \frac{3}{4}; \frac{1}{5}; \frac{2}{5}; \frac{4}{5}; \frac{7}{8}; \frac{5}{8}; \frac{1}{6}; \frac{5}{6};$   
 $\frac{1}{9}; \frac{5}{9}; \frac{1}{7}; \frac{2}{7}; \frac{3}{8}; \frac{5}{8}; \frac{1}{4}.$

6. A man bought a wheelbarrow for \$3.60 and sold it at a gain of  $33\frac{1}{3}\%$ . How much did he gain?

7. How many hours are there in  $66\frac{2}{3}\%$  of a day?

8. What is  $37\frac{1}{2}\%$  of .64?

9. The dividend being .4 and the divisor 80, what is the quotient?

10. How many farthings are there in one pound sterling? Eighty farthings is what decimal part of a pound sterling?

**Written.**

1. A man, having 5040 cattle, sold  $37\frac{1}{2}\%$  of them. How many had he left?

2. A man, owning a house worth \$13860, sold it at a gain of  $16\frac{2}{3}\%$ . How much did he get for it?

3. What is the area in square feet of a triangular plot of ground having a base of 25 ft. and an altitude of 20 ft.?



4. A triangular plot of ground is 60.25 ft. in length and 20.50 ft. in altitude. What is the area of the plot in square feet?

5.  $\frac{3}{4} + \frac{6}{7} = ?$      $\frac{3}{4} + 4\frac{2}{3} = ?$

6. A farmer having 2500 bu. of wheat takes 75 % of the wheat to market. How many bushels has he left?

7. A dealer buys 550 yd. of cloth and sells 80 % at  $37\frac{1}{2}$ ¢ a yard. How much does he receive for what he sells?

8. The altitude of a right-angled triangle is 20.6 yd. and the base is 50.84 yd. What is its area in square yards?

9. What part of  $24\frac{1}{3}$  bu. is  $6\frac{1}{12}$  bu.?

10. A young man spent \$195 $\frac{1}{5}$  during his first term at college, which was  $\frac{4}{5}$  of his year's allowance. How much was his year's allowance? How much did he have left for the remainder of the year?

### LV

#### Oral.

Rapidly add :

225	580	754	640	306	420	618	427	350	273	165
<u>154</u>	<u>390</u>	<u>540</u>	<u>240</u>	<u>231</u>	<u>290</u>	<u>230</u>	<u>135</u>	<u>230</u>	<u>122</u>	<u>130</u>

What is the shortest way to multiply a number by 5? by 25?

Since 5 equals  $\frac{1}{2}0$ , state a short way of dividing a number by 5.

Tell a short way of dividing a number by 10. What

effect on a number results from moving the decimal point one place to the left?

Divide 325 by 10. Divide 420 by 10, and multiply the quotient by 2.

Divide 420 by 5. Divide 360 by 10, and multiply the quotient by 2, and tell by what number you can divide 360 and get the same quotient.

1. If 1 wagon costs \$48, how much will 5 wagons cost?
2. If a cow consumes on an average 4.5 T. of hay in a year, how many tons are required to feed a herd of 25 cows?
3. If the board bill of 5 people amounted in one year to \$910, what was the average cost?
4. If the yearly income of 5 people amounts to \$1800, how much is the average income?
5. What is  $\frac{1}{5}$  of 620? \_\_\_\_\_

Rapidly add :

530	163	321	460	330	470	379	665	650	630	456
260	220	530	320	440	650	126	123	270	230	127

6. At the rate of one horse for \$180, how much are 5 horses worth? 25 horses?
7. If \$185 is the amount received for 5 cows, what is their average value?
8. Reduce the complex fraction  $\frac{51}{100}$  to a simple one.
9. The distance from Cortland to Ithaca is 20 mi. If a boy walks .7 of the way in one day, how far has he walked?

10. Eugene earned \$14, which was .7 of what his father earned. How much did his father earn?

Written.

- |          |             |                                  |   |
|----------|-------------|----------------------------------|---|
| 1. Add : | 4856        | 2. What is the sum of            | $12.37\frac{1}{2}$ ,  |
|          | 3724        |                                  | $144.18\frac{3}{4}$ , $6.62\frac{1}{2}$ , $175.06\frac{1}{4}$ , $40.17\frac{7}{8}$ , and  |
|          | 9642        |                                  | 398?  |
|          | 5387        | 3. Add                           | $8\frac{1}{8}$ , $45\frac{5}{8}$ , $2\frac{1}{2}$ , $4\frac{1}{2}$ , and $\frac{3}{10}$ . |
|          | 4963        | 4. What part of                  | $144$ is $64$ ?   |
|          | 8798        | 5. How much do I have to pay for |   |
|          | 6279        |                                  | $15\frac{5}{8}$ lb. of butter if $24$ lb. cost \$5.76?                                    |
|          | 5476        |                                  |   |
|          | 3245        |                                  |   |
|          | <u>8942</u> |                                  |   |

6. From  $108\frac{2}{3}$  take  $90\frac{2}{3}$ .
7. What number added to  $6\frac{3}{4}$  will equal  $16\frac{3}{4}$ ?
8. From  $\frac{3}{4}$  of  $\frac{5}{8}$  take  $\frac{3}{8}$  of  $\frac{3}{8}$  of  $\frac{5}{8}$ .
9. What is the difference between 203.007 and 302.07?
10. A father having 504.03 A. of land gave 100.45 A. to one son and 263.75 A. to another. How many acres had he left?

## LVI

Oral.

Rapidly add :

4.5	.87	8.50	.007	.4	3.2	.46	3.52	.235	4.52
<u>2.3</u>	<u>.6</u>	<u>5.32</u>	<u>.2</u>	<u>.312</u>	<u>1.005</u>	<u>.017</u>	<u>2.4</u>	<u>.148</u>	<u>3.18</u>

1. Mary is  $12\frac{7}{12}$  yr. old; Jane is  $31\frac{1}{2}$  yr. older. How many years and months old is Jane?
2. How much will 6 pears cost if a dozen cost 72¢?
3. How much will 72 slates cost at  $12\frac{1}{2}$ ¢ each?

4. How much will 48 yd. of calico cost at  $16\frac{2}{3}$ ¢ a yard?
5. What decimal part of a week is 5 da.?

Rapidly add :

$$\begin{array}{l} \frac{5}{100} + \frac{7}{10}; \frac{17}{10} + \frac{8}{100}; \frac{15}{100} + \frac{5}{1000}; \frac{25}{100} + \frac{18}{10}; \frac{35}{1000} + \frac{8}{100}; \\ \frac{25}{10} + \frac{8}{100}; \frac{800}{1000} + \frac{8}{10}; \frac{2}{5} + \frac{7}{10}; \frac{48}{10} + \frac{105}{1000}; \frac{18}{100} + \frac{9}{1000}; \\ \frac{60}{10} + \frac{8}{10}; \frac{48}{100} + \frac{48}{1000}; \frac{27}{1000} + \frac{3}{10}; \frac{15}{10} + \frac{125}{100}; \frac{48}{1000} + \frac{15}{100}. \end{array}$$

6. From a chest of tea containing  $45\frac{1}{4}$  lb.,  $4\frac{3}{8}$  lb. were sold. How many pounds remained?
7. 55 is  $\frac{2}{3}$  more than what number?
8. A man is 42 yr. old, and  $\frac{2}{7}$  of his age is the age of his son. How old is his son?
9. How many quarts are there in .75 pk.?
10. What decimal part of a ton is 125 lb.?

Written.

1. What is the difference between 30.053 and 18.7? between 300.53 and 187?
2. From a piece of cloth containing  $17\frac{1}{4}$  yd., I sold  $3\frac{1}{2}$  yd. to one person and  $5\frac{1}{8}$  yd. to another. How many yards had I left?
3. If  $\frac{2}{7}$  of a farm is worth \$2364, how much is the whole farm worth?
4. What is the value of  $8 \times 8\frac{1}{8} \times \frac{7}{10} \times \frac{1}{14}$ ?
5. How many acres are there in a field the length of which is 402 rd. and width 31 rd.?

6. The dividend is .12096; the quotient is .032. What is the divisor?

7. Multiply 31.5 by 27.9, and divide the product by 9.765.

8. A man's income this year is \$2160, which is  $\frac{1}{9}$  more than it was last year. How much was his income last year?

9. A triangular garden is 25 ft. long and its altitude is 13 ft. What is its area?

10. Tell what kind of a fraction the following is, and simplify it:  $\frac{\frac{5}{8} \text{ of } \frac{2}{3}}{\frac{9}{10}}$ .

### LVII

#### Oral.

Rapidly divide:

$$4 \overline{)12 \text{ ft. } 4 \text{ in.}}$$

$$12 \overline{)120 \text{ ft. } 8 \text{ in.}}$$

$$8 \overline{)24 \text{ bu. } 16 \text{ qt.}}$$

$$3 \overline{)24 \text{ gal. } 3 \text{ qt.}}$$

$$8 \overline{)18 \text{ bu. } 0 \text{ pk.}}$$

$$8 \overline{)60 \text{ pk. } 3 \text{ qt.}}$$

$$9 \overline{)25 \text{ bu. } 6 \text{ qt.}}$$

$$12 \overline{)28 \text{ gal. } 2 \text{ qt.}}$$

$$6 \overline{)58 \text{ gal. } 1 \text{ pt. } 3 \text{ gi.}}$$

$$8 \overline{)6 \text{ bu. } 0 \text{ qt.}}$$

1. How many times are 4 qt. contained in 2 bu.? in 8 bu.?

2. How many seconds are there in  $2\frac{3}{4}$  min.? in  $3\frac{1}{12}$  min.? in  $7\frac{1}{8}$  min.?

3. How much will 8 pearl buttons cost at 75¢ a dozen?

4. How much will 8 sheets of paper cost at 18¢ a quire?

5. What is the cost of  $\frac{1}{2}$  a gross of lead pencils at 50¢ a dozen?

---

Rapidly divide:

$$\begin{array}{r} 4 \overline{)20 \text{ bu. 0 pk.}} \end{array} \quad \begin{array}{r} 4 \overline{)23 \text{ bu. 0 pk.}} \end{array} \quad \begin{array}{r} 6 \overline{)43 \text{ gal. 0 qt. 0 pt.}} \end{array}$$

$$\begin{array}{r} 3 \overline{)16 \text{ gal. 2 qt.}} \end{array} \quad \begin{array}{r} 7 \overline{)14 \text{ bu. 7 qt.}} \end{array} \quad \begin{array}{r} 3 \overline{)20 \text{ da. 0 hr.}} \end{array}$$

$$\begin{array}{r} 6 \overline{)34 \text{ gal. 2 qt.}} \end{array}$$

$$\begin{array}{r} 16 \overline{)80 \text{ bu. 16 pt.}} \end{array}$$

$$\begin{array}{r} 12 \overline{)52 \text{ bu. 0 pk.}} \end{array}$$

$$\begin{array}{r} 8 \overline{)60 \text{ lb. 0 oz. Troy.}} \end{array}$$

6. How much will 12 quires of paper cost at \$4 a ream?

7. How much will 4 gross of pens cost if the wholesale rate is 2 pens for a cent?

8. How much will 3 qt. of molasses cost at 96¢ a gallon?

9. How many bottles, each holding a gill, can you fill from a half gallon of alcohol?

10. If I sell a gross of hairpins for 5¢ a dozen and by so doing gain 2¢ a dozen, how much did they cost me a gross?

#### Written.

1. A charitable society received from one person 18 bu. 6 qt. of wheat; from another, 16 bu. 3 pk.; from a third, 22 bu. 5 qt.; from a fourth, 14 bu. 2 pk. All of this wheat was divided equally among 24 families. How many bushels, pecks, and quarts did each family receive?

2. Divide 29 yd. 18 in. by 6.

3. I have 9 gal. of sirup to put into 40 cans. How many pints can I put into each can?

4. Read  $8^{\circ} 5' 8''$ , and reduce to seconds.

5. Reduce 108000' to degrees.

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6. Multiply 37 ft. 6 in. by 7.
7. One side of a square is 9 ft. 7 in. How long is the perimeter?
8. Find the sum of 2 hr. 38 min. 42 sec., 3 hr. 25 min. 36 sec., and 5 hr. 17 min. 58 sec.
9. Divide .1 by .2 and .35 by 35, and find the product of the quotients.
10. If  $\frac{3}{4}$  of a pound of tea costs  $\$ \frac{1}{2}$ , how many pounds can be bought for  $\$ 7\frac{1}{2}$ ?

## LVIII

## Oral.

Rapidly multiply:

4 bu. 2 pk.	8 gal. 3 qt.	2 yd. 4 in.	5 da. 8 hr.	4° 2'
<u>3</u>	<u>4</u>	<u>6</u>	<u>2</u>	<u>3</u>

5' 15"	5 hr. 16 min.	7 ft. 5 in.	8 min. 30 sec.
<u>4</u>	<u>3</u>	<u>4</u>	<u>3</u>

9 bu. 3 pk.	4 pk. 4 qt.	2 qt. 1 pt.	5 gal. 2 qt.	4 pt. 3 gi.
<u>8</u>	<u>4</u>	<u>4</u>	<u>6</u>	<u>3</u>

1. A boy bought a bushel of chestnuts for \$2.40 and sold the nuts for 12¢ a quart. How much did he gain?
2. What number increased by  $\frac{1}{5}$  of itself equals 24?
3. A boat was sold for \$45, which was  $\frac{2}{3}$  more than it cost. How much did it cost?
4. If .35 of a number is 28, what is the number?
5. What decimal part of  $\frac{1}{2}$  is  $\frac{1}{4}$ ?

Rapidly multiply :

3 bu. 1 pk.	5 gal. 3 qt.	5 bu. 1 pt.	3 qt. 4 gi.	5 gal. 1 pt.
<u>4</u>	<u>6</u>	<u>16</u>	<u>24</u>	<u>30</u>

6 bu. 4 qt.	6 bu. 6 qt.	3 ft. 4 in.	7 yd. 2 ft.	3 qt. 1 pt.
<u>8</u>	<u>12</u>	<u>20</u>	<u>3</u>	<u>2</u>

5 da. 8 hr.	6 hr. 12 min.	3° 8'	5' 15"	5 hr. 10 min.
<u>3</u>	<u>6</u>	<u>12</u>	<u>4</u>	<u>7</u>

6. How much will 3 pk. of potatoes cost at 60 ¢ a bushel?

7. A boy after losing some marbles counted the remainder and found that he had 25, which was .25 of the number he had lost. How many did he lose, and how many had he before losing any?

8. What number increased by  $\frac{5}{8}$  of itself equals 22?

9. A farm yielded 120 bu. of wheat this year, which was  $.83\frac{1}{3}$  of the amount it yielded the previous year. How many bushels did it yield the previous year?

10. How many cubic feet are there in a room 12 by 10 by 8 ft.?

**Written.**

1. What is the area of a right-angled triangle the base of which is 28 ft. and altitude 10 yd.?

2. I bought 5 bu. of berries for \$5 and sold them at 20 ¢ per quart. How much did I gain?

3. How many times is  $4\frac{1}{3}$  contained in  $7\frac{2}{3}$ ?



4. A farmer sold 25 % of his farm of 412 A. for \$35½ an acre. How much did he receive for the part sold?

5. Multiply 12.5 by .004 and divide the product by 2.5.

6. How many barrels of apples, at \$1.87½ a barrel, must be given in exchange for 12½ yd. of cloth at 60 ¢ a yard?

7. What decimal part of  $\frac{4}{5}$  is  $\frac{3}{8}$ ?

8. How much will it cost to dig the cellar of a house 28 ft. long, 18 ft. wide, and 6 ft. deep, at 45 ¢ a cubic yard?

9. Find the value of  $\frac{75 \times 8 \times 120}{25 \times 15}$ .

10. Simplify  $\frac{12\frac{1}{2} + 3\frac{1}{8}}{6\frac{1}{4} + 3\frac{1}{8}}$ .

### LIX

#### Oral.

Rapidly answer :

56 is  $\frac{1}{8}$  more than what number?  $\frac{3}{4}$  more?  $\frac{2}{5}$  more?  $\frac{5}{6}$  more?  $\frac{1}{8}$  more?  $\frac{1}{7}$  more?

24 is  $\frac{1}{2}$  more than what number?  $\frac{1}{3}$  more?  $\frac{1}{5}$  more?  $\frac{3}{8}$  more?  $\frac{1}{7}$  more?  $\frac{5}{7}$  more? 36 is  $\frac{1}{2}$  more than what number?  $\frac{1}{3}$  more?  $\frac{1}{5}$  more?  $\frac{4}{5}$  more?  $\frac{2}{7}$  more?  $\frac{5}{7}$  more?  $\frac{1}{8}$  more?

What number increased by  $\frac{1}{3}$  of itself will equal 20? 24? 36? 72? 48?

What number increased by  $\frac{1}{5}$  of itself will equal 24? 96? 12? 48? 54?

1. If 12 hats cost \$7, how much will 36 hats cost?

2. How many bottles each containing 1½ pt. will be needed to contain 2½ gal.?

3. Reduce .016 to a common fraction.

4. A man sold 60 sheep, that number being  $.37\frac{1}{2}$  of the whole number he had in his flock. How many sheep had he in his flock?

5. A man has \$15, which is  $\frac{1}{5}$  more than he had yesterday. How much had he yesterday?

Rapidly find the cost of the following articles:

12 at \$1.25	9 at \$1.33 $\frac{1}{3}$	24 at \$.16 $\frac{2}{3}$
15 at \$1.60	18 at \$1.66 $\frac{2}{3}$	36 at \$.08 $\frac{1}{2}$
8 at \$1.75	16 at \$1.37 $\frac{1}{2}$	72 at \$.83 $\frac{1}{3}$
20 at \$1.80	32 at \$1.87 $\frac{1}{2}$	49 at \$.14 $\frac{2}{7}$

6. How much must I pay for 84 yd. of cloth at \$1.75 a yard?

7. A dealer bought 360 cows and sold 30 % of them. How many cows did he sell?

8. In a list of 25 words a boy had 60 % right. How many words had he wrong?

9. How much will 1 bu. 2 pk. 2 qt. of cherries cost at 8 ¢ a quart?

10. What part of 54 bu. is  $\frac{3}{6}$  bu.? of 60 is 48?

Written.

1.  $12\frac{3}{4}$  lb. is what part of 29 lb.?

2. A grocer had 150 lb. of butter. If he sold  $22\frac{1}{2}$  lb., what part of his stock did he sell? What part did he have left?

3. A man can do a piece of work in  $16\frac{1}{4}$  da. What part of it can he do in  $4\frac{1}{3}$  da.?

4. From  $.2\frac{1}{5}$  take  $.05\frac{1}{4}$ .

5. Simplify  $\frac{\frac{4}{5} \times \frac{1}{8} \times 4\frac{1}{6}}{6\frac{3}{8}}$ .

---

6. (a) Multiply 4.96 by  $.17\frac{1}{2}$ .  
(b) Find  $17\frac{1}{2}\%$  of 4.96.
7. A man can do a piece of work in  $18\frac{1}{4}$  da. What part of it can he do in  $6\frac{2}{3}$  da.?
8. What part of \$605 is  $\$27\frac{1}{2}$ ?
9. A farmer having 480 bu. of corn sold  $87\frac{1}{2}\%$  of it. How many bushels had he left?
10. Simplify  $\frac{\frac{2}{3} \times \frac{3}{4} \times 2\frac{1}{2}}{\frac{1}{2} \times 4\frac{1}{2}}$ .

**LX****Oral.**

Rapidly subtract:

870	620	530	970	860	8800	8700	7200	379	483	665
<u>430</u>	<u>480</u>	<u>280</u>	<u>580</u>	<u>270</u>	<u>6400</u>	<u>2300</u>	<u>3900</u>	<u>126</u>	<u>260</u>	<u>123</u>

1. If the dividend is .4 and the divisor 80, what is the quotient?
2.  $2\frac{1}{2}$  is what decimal part of  $3\frac{3}{4}$ ?
3. At 4¢ a quart, how much will  $\frac{1}{2}$  bu. cost?
4. How much will 5 gal. cost at 8¢ a quart?
5. Forty grains is what decimal part of an ounce Troy?  
How many grains are there in an ounce Troy?

Rapidly subtract:

740	47000	665	746	520	7800	820	458	943	4500	852
<u>360</u>	<u>8000</u>	<u>123</u>	<u>630</u>	<u>380</u>	<u>6500</u>	<u>760</u>	<u>324</u>	<u>658</u>	<u>2700</u>	<u>346</u>

6. Eighty grains is what decimal part of an ounce Troy?
7. One pint is what decimal part of a peck?

8. What is the difference in the cost of 8 yd. of cloth at 2 dimes a yard and 6 yards at 30 ¢ a yard?
9. How many hundredths are there in .0400?
10. 4.08 is .2 of what number?

**Written.**

1. How many grains are there in 47 lb. 10 oz. 7 dr.?
2.  $4\frac{3}{4}$  is 2.5 times what number?
3. Find the sum of  $\frac{3}{4}$ ,  $\frac{1}{16}$ ,  $\frac{5}{8}$ ,  $\frac{1}{2}$ , giving the answer in decimal form.
4. If  $7\frac{1}{2}$  A. cost \$1560, how much will  $\frac{3}{8}$  A. cost?
5. What decimal part of  $62\frac{1}{2}$  is  $18\frac{3}{4}$ ?

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6. If 4800 lb. cost \$18.12, what is the price of a ton?
7. Reduce  $38.41\frac{2}{3}$  to a common fraction.
8.  $12\frac{1}{2}$  is what decimal part of  $18\frac{3}{4}$ ?
9. In £  $21\frac{1}{4}$  how many pence are there?
10. Reduce  $\frac{2}{1600}$  to millionths.

## FOURTH MONTH

**RAPID DRILLS** — daily.

**READING AND WRITING NUMBERS** — continued.

**THE FUNDAMENTAL OPERATIONS** — to secure quickness and accuracy.

**COMMON FRACTIONS** — reviewed.

**DECIMAL FRACTIONS** — reviewed.

**DENOMINATE NUMBERS** — reviewed.

**MEASUREMENTS** — Areas of acute and of obtuse-angled triangles.

**TABLES** — circular, time, and review.

**BILLS** — reviewed.

**PERCENTAGE.** Finding per cents of numbers. Finding what per cent one number is of another.

**PROBLEMS.** To cover the work of the month in common and decimal fractions, and tables.

Finding a part of a number.

Finding a number when a fractional part of it is given.

Finding what part one number is of another.

Finding what decimal part one number is of another.

Finding a number when the number plus or minus a fractional part of it is given.

### LXI

**Oral.**

Rapidly find the subtrahend :

77	56	35	24	67	76	89	13	38	54	45
?	?	?	?	?	?	?	?	?	?	?
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
100	100	100	100	100	100	100	100	100	100	100

How many hundredths are there in  $\frac{1}{2}$ ? in  $\frac{1}{8}$ ? in  $\frac{3}{4}$ ? in  $\frac{1}{3}$ ?

What per cent is  $\frac{1}{4}$ ?  $\frac{1}{5}$ ?  $\frac{4}{5}$ ?  $1\frac{1}{2}$ ?  $1\frac{1}{4}$ ?  $1\frac{1}{5}$ ?  $\frac{7}{8}$ ?  $\frac{3}{8}$ ?

1. I paid \$4800 for my house, and sold it to gain  $12\frac{1}{2}\%$ . How much money did I gain?

2. James had 40 marbles and John had  $25\%$  more. How many marbles had John?

3. Divide 1.2 by .006; 1.2 by .03; .12 by .6.

4. If .04 of an acre is worth \$8, how much is an acre worth at that rate?

5. I gave \$24 for a watch and  $\frac{1}{2} + \frac{2}{3}$  of this money is 4 times what I gave for the chain. How much did the chain cost me?

Rapidly find the subtrahend:

56	69	35	19	61	47	47	12	17	23	76	87
<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>	<u>?</u>
84	100	95	69	90	54	94	88	78	45	100	99

What is  $12\frac{1}{2}\%$  of 80?  $33\frac{1}{3}\%$  of 60?  $20\%$  of 120?  $50\%$  of 600?

6. How much will 96 doz. eggs cost at the rate of  $16\frac{2}{3}\text{¢}$  a dozen?

7. From  $\frac{1}{3}$  subtract  $.10\frac{2}{3}$ .

8. A boy having  $\$ \frac{3}{4}$  gave  $\$ \frac{2}{5}$  for a knife. How much had he left?

9. If  $\frac{1}{3}$  of a barrel of flour is worth \$3, how much will a barrel cost?

10. If 3 qt. and 1 pt. of oil cost 7¢, how much will 3 pt. cost?

**Written.**

1. Subtract 2.0046 from 3.3.
2. Multiply 1.001 by 33.004.
3. Divide 5.6 by .00014.
4. Divide  $1\frac{2}{3}$  by  $\frac{5}{3}$ .
5. What decimal fraction of  $\frac{5}{7}$  is  $\frac{1}{2}$ ?
6. Add .003, 1.25, and 2.006.
7. Divide .048 by 1600.
8. Multiply .26 by .0035.
9. A contractor who had agreed to build a road during June, July, August, and September, completed it in 105 da. In what part of the time contracted for did he finish it?
10. Add  $\frac{3}{4}$  of  $\frac{5}{6}$  of  $\frac{8}{10}$ ,  $\frac{\frac{4}{5}}{\frac{7}{10}}$ , and  $\frac{3}{8}$ .

**LXII****Oral.**

Rapidly add :

35	42	56	63	63	48	34	41	36	72	53	72	49	81	37
28	28	42	56	48	28	28	34	19	39	38	46	16	37	24

1. How many  $\frac{1}{2}$ -lb. packages can you make from 12 lb. of candy? how many  $\frac{1}{4}$ -lb. packages?
2. If a man can do  $\frac{2}{3}$  of a piece of work in a day, how long, at the same rate, will it take him to do all the work?
3. Seven eighths of the pupils in a class are present. There are 42 pupils present. How many pupils are there in the class?

4.  $\frac{1}{12}$  of 72 +  $\frac{1}{12}$  of 120 = ?

5. When 30 sheep cost \$165, how much must I pay for 60?

Rapidly add :

52	49	81	54	46	46	64	53	41	63	54	72	49	37	18
<u>47</u>	<u>16</u>	<u>39</u>	<u>48</u>	<u>37</u>	<u>19</u>	<u>18</u>	<u>18</u>	<u>36</u>	<u>48</u>	<u>48</u>	<u>39</u>	<u>16</u>	<u>24</u>	<u>16</u>

6. A man burns  $\frac{1}{3}$  T. of coal a day. How many days will 6 T. last him?

7. On a stormy day one pupil of every 5 was absent. How many pupils were absent from a class of 45 pupils?

8. How many pecks are there in 56 qt. ?

9. How many inches are there in the perimeter of a rectangle 9 in. long and 7 in. wide?

10. How many eighths are there in  $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$ ?

Written.

1. How many miles will a train travel in 24 hr., if its rate is 40.478 mi. per hour?

2. A triangle is 13.7 in. on each side. Find the length of its perimeter.

3. Find the cost of a roll, 150 running feet, of wire netting at 38¢ per 100 ft.

4. What part of  $\frac{7}{8}$  is  $\frac{5}{8}$ ?

5. What is .875 of  $18\frac{2}{3}$ ?  $62\frac{1}{2}\%$  of  $14\frac{2}{3}$ ?

6. A man sold a horse for \$125 and received in payment  $22\frac{1}{2}$  yd. of cloth at  $\$2\frac{1}{2}$  a yard, and the balance in tea worth  $87\frac{1}{2}\%$  a pound. How many pounds of tea did he receive?

7. Find the l. c. m. of 8, 16, 64, and 72.



8. John and James leave the school building at the same time. John walks down the street  $17\frac{3}{20}$  rd. and James up the street  $19\frac{1}{8}$  rd. How far apart are they then?

9. Find the area of a city block 600 ft. long and 200 ft. wide. What is the area of each of the two triangles that are formed by drawing a diagonal? Compare as to size an acre with a city block 600 ft. long and 200 ft. wide.

10. How many square yards are there in a triangular roof with a base of  $34\frac{1}{2}$  ft. and an altitude of  $13\frac{1}{2}$  ft.?

### LXIII

#### Oral.

At sight, multiply, first 12, then 13, then 14, then 15, then 16, by each of the following numbers:

3; 4; 5; 6; 7.

Draw a 2-inch square. What kind of angles are formed within the corners of this figure? Draw a diagonal. What kind of triangles are formed by the diagonal?

Draw another figure having four sides each 2 in. long, but containing two acute and two obtuse angles. Draw a diagonal. What kind of triangles does the diagonal form? Each triangle is what part of the whole figure? If the figure contains 8 sq. in., how many square inches are there in one of the triangles?



Draw the diagonals of the above parallelograms and name the kind of triangles formed in each case.

Give any dimensions you choose for the base and altitude of these parallelograms, and from these find the area of each. Also find the area of each triangle formed by drawing a diagonal in each figure.

1. What is the area of a triangle the base of which is 16 in. and the perpendicular height or altitude of which is 12 in.?

2. How many square feet are there in a triangle the base of which is 9 ft. and the altitude, 3 ft.?

3. Find the area of an acute-angled triangle having a base of  $2\frac{1}{2}$  yd. and an altitude of 1 yd.

4. Find the area of an obtuse-angled triangle with a base of  $5\frac{1}{4}$  yd. and an altitude of 2 yd.

5. How many square yards are there in a grass plot 12 ft. long and 8 ft. wide?

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Rapidly multiply, first 12, then 13, then 14, then 15, then 16, by each of the following numbers:

8; 9; 10; 20; 30.

Draw a horizontal line 2 in. long, and from one end of it draw a vertical line 2 in. long. What kind of angle do these two lines form? Draw a third line connecting the two other lines to form a triangle. What kind of triangle is this? With lines each 2 in. long form an angle that is less than a right angle. What kind of angle is it? Draw a third line, connecting the two other lines to form a triangle. What kind of triangle has been formed? Draw two lines forming an angle that is greater than a right angle. What kind of angle is it? What kind of triangle can be formed by drawing a line connecting the two other lines?

6. What is the area in square feet of a rectangle, the base of which is  $12\frac{1}{2}$  ft. and the height or altitude, 2 ft.?

7. Find the area in square feet of a triangle having a base of 14 in. and an altitude of 8 in.

8. How many square yards are there in a triangle having a base of 27 ft. and an altitude of 10 ft.?

9. Two thirds of a pole is in the air,  $\frac{1}{6}$  of it is in water, and the rest in mud. What part of the pole is in the mud? (Make a diagram, showing the parts.)

10. Divide 21 by  $\frac{3}{4}$ ; 25 by  $2\frac{1}{2}$ ; 32 by  $1\frac{3}{4}$ .

**Written.**

1. A triangular plot of ground has a base of 6 rd. and an altitude of  $3\frac{1}{2}$  rd. How many square rods are there in the area?

2. Find the area in square yards of a parallelogram with a base of 45 yd. and an altitude of 1.75 yd.

3. A village lot is 50 ft. by 120 ft. How many square feet are there in its area? How many square yards are there?

4. What is the altitude of a rectangle that is 67 in. long and contains 1206 sq. in.?

5. How many feet long is a rectangular park that contains 942500 sq. ft. and is 650 ft. wide?

6. Find the area in square feet of a parallelogram the base of which is 54 ft. 9 in. and the altitude,  $16\frac{2}{3}$  ft.

7. What is the area in square feet of a triangle the base of which is 32 in. and the altitude, 32 ft.?

8. Find the area in square feet of a triangle the base of which is 68 yd. and altitude, 32.65 ft.

9. How much will it cost to carpet a room 36 ft. long and 24 ft. wide at \$.68 a yard?

10. Find the value of  $\frac{2}{3}$  of  $3\frac{1}{2} \times \frac{2}{3}$ .

### LXIV

#### Oral.

Rapidly multiply, first 1.2, then .05, then .12, then .014, then .0016, by each of the following numbers:

3; 5; 6; 8; 10.

Name three kinds of triangles and describe each kind.

Tell how to find the area of a triangle; of a parallelogram.

Compare the size of a triangle with the parallelogram of which it forms a part.

1. Find the area in square feet of a triangle the base of which is 6 ft. and the altitude,  $1\frac{1}{3}$  ft.

2. How many square feet are there in a triangle the base of which is 3 yd. and the altitude,  $1\frac{2}{3}$  ft.?

3. What is the length of a rectangle that is 4 ft. wide and contains 32 sq. ft.?

4. What is the length of the base of a triangle that contains 16 sq. ft. and has an altitude of 8 ft.? (Make a diagram.)

5. If the altitude of a triangle is 3 in. and the triangle covers 108 sq. in., how long is the base?

Rapidly multiply, first .8, then .09, then .014, then .0012, then .00015, by each of the following numbers:

4; 7; 9; 20; 30.

6. How many square feet are there in a triangle the base of which is 8 ft. and the altitude, 4 ft.?

7. How many square feet are there in a triangle the base of which is 1 yd. and the altitude,  $1\frac{1}{2}$  ft.?

8. A triangle contains 54 sq. ft. If the altitude is 6 ft., how long is the base?

9. How many square yards are there in the surface of a pavement 16 yd. long and 2 yd. 18 in. wide?

10. What is the length of the base of a parallelogram containing 12 sq. ft. that has an altitude of 1.2 ft.?

**Written.**

1. How many square feet are there in a triangle the base of which is 117.96 yd. and the altitude,  $37\frac{2}{3}$  yd.?

2. Find the area of a triangle the base of which is 24.35 ft. and the altitude, 16.42 ft.

3. How much will it cost to plaster a ceiling 56 ft. long and 24 ft. wide at 85 ¢ a square yard?

4. What is the altitude of a triangle containing 576 sq. ft. and having a base of 64 ft.? (Explain with the aid of diagram.)

5. The area of a triangle is 28 sq. yd. The base is 16 sq. yd. Find the altitude.

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6. How many square feet are there in a triangle the base of which is 25 ft. 9 in. and the altitude 18 ft. 6 in.? How many feet are there in the perimeter?

7. How much will it cost to plaster a ceiling 18 ft. long and 15 ft. wide at 54 ¢ a square yard?

8.  $\frac{3}{4}$  of  $1\frac{1}{2}$  of 3 = ?

9.  $\frac{3}{4} + \frac{1}{2} + \frac{1}{8}$  of  $4\frac{1}{2} = ?$
10. Multiply .0015 by 3.2.

**LXV****Oral.**

Rapidly multiply, first 1.2, then 1.4, then 1.6, then .12, then .14, by each of the following numbers :

.5; .05; .3; .04; .002.

1. Read  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{7}{8}$ , as fractions having the same denominator.
2. What is the l. c. m. of 8, 16, and 64?
3. Name a factor that is common to both 35 and 45.  
Name two factors that are common to both 30 and 48.
4. Name a common divisor of 20 and 22; of 16 and 36.
5. How much will 2.5 doz. eggs cost at 28¢ a dozen?

Rapidly multiply, first .12, then .015, then .08, then .009, then .014, by each of the following numbers :

.4; .06; .6; .8; .003.

6.  $\frac{1}{7}$  of  $1\frac{1}{2} = ?$   $\frac{1}{8}$  of  $1\frac{2}{3} = ?$   $\frac{1}{2}$  of  $\frac{8}{9} = ?$   $\frac{1}{3}$  of  $\frac{1}{5} = ?$   $\frac{1}{5}$  of  $\frac{1}{7} = ?$   $\frac{3}{4}$  of  $\frac{1}{5} = ?$

7. What is a prime number? Name the prime numbers from 1 to 50.

8. If a train runs  $\frac{1}{3}$  of a certain distance in 1 hr., what part of the distance can it run in 45 min.?

9. If a teacher lives  $1\frac{2}{3}$  mi. from the schoolhouse, and one of her pupils lives  $\frac{1}{5}$  as far, how far from the schoolhouse does the pupil live?

10. A certain farm is worth \$60 an acre. How much is  $\frac{3}{4}$  of an acre worth?

**Written.**

- |              |  |
|--------------|--|
| 1. Add: 5274 | 2. My coal for the winter cost me                              |
| 9252         | \$68.25. How much did it cost per                              |
| 4956         | ton if I bought $10\frac{1}{2}$ T.?                            |
| 3875         | 3. If $\frac{3}{4}$ yd. ribbon is worth 16¢,                   |
| 8394         | how much is $2\frac{5}{8}$ yd. worth?                          |
| 7657         | 4. How many cubic inches are                                   |
| 3203         | there in a box that is $3\frac{1}{2}$ in. long, $2\frac{1}{2}$ |
| 4318         | in. wide, and $1\frac{1}{8}$ in. deep?                         |
| 9867         | 5. Multiply 0.427 by 345.                                      |
| 9449         |  |
| 6878         |  |
| 4396         | 6. Divide 458015 by 532.                                       |
| 8714         | 7. How many bottles holding $\frac{1}{2}$                      |
| 9244         | pt. each can be filled from $2\frac{1}{2}$ gal.?               |
| <u>8859</u>  | 8. A merchant sold a 40-yd. piece                              |
|              | of cloth for \$45, gaining 12¢ a yard.                         |

How much did the piece cost him?

9. If 15 men can do a piece of work in 4 da. and 7 hr. (a working day being 8 hr.), how long will it take 3 men working at the same rate?

10. A dry-goods dealer sold 75 yd. of cloth for \$112.50, thereby gaining \$28.50. How much did it cost him per yard?

**LXVI**

**Oral.**

Rapidly divide, first .48, then 4.8, then .072, then 3.6, then .36, by each of the following numbers:

6; 12; 4; 3; .2.

1. At  $\$4\frac{1}{2}$  a bushel, how many bushels of corn can be purchased for \$12?
2. Eight dollars is  $\frac{4}{5}$  as much as I paid for a sheep which I sold for \$12. How much did I gain?
3. If .25 of a ream of paper costs  $\$1\frac{1}{2}$ , how much is that per ream? How much is that per quire?
4. An inch is what (common fractional) part of a foot? An inch is what decimal part of a foot?
5. Reduce .001200 to the lowest decimal terms. Reduce .05 to hundred-thousandths.

---

Rapidly divide, first 2.4, then .48, then 9.6, then .72, then 144, by each of the following numbers:

.3; .02; .4; .8; .12.

6. What is .75 of 16? 25% of 24?
7. What is  $16\frac{2}{3}\%$  of 72?  $83\frac{1}{3}\%$  of 54?
8. Forty is  $\frac{5}{8}$  of what number? Forty is  $.62\frac{1}{2}$  of what number?
9. What is .5 of  $.12\frac{1}{2}$ ?
10. If it takes 8 screws to fasten a school desk to the floor, how many desks could be fastened with 4 gross of screws?

**Written.**

1. A farmer planted  $12\frac{3}{4}$  A. of corn,  $7\frac{1}{8}$  A. of oats,  $9\frac{1}{3}$  A. of wheat, and  $10\frac{5}{12}$  A. of buckwheat. How many acres all together did he have under cultivation?
2. Find the g.c.d. of 720 and 1728.
3. A farmer sold  $7\frac{1}{2}$  A. of land for \$70.50. How much did he get per acre?



4. If a rail is  $16\frac{1}{2}$  ft. long, how many rails will be used laying a monorail track  $1\frac{1}{2}$  mi. in length?

5. At 260 mi. a day, how long would it take a steamer to go from San Francisco to Guam, a distance of 5200 mi.?

- |  |   |
|--|---|
| 6. Add : 48756<br>32879<br>12345<br>67891<br>23678<br>94512<br>34567<br>89123<br>56472<br><u>87934</u> | 7. How many square rods are there in my garden which is 545 ft. long and 82 ft. wide?<br>8. What is the value of a rectangular field 40 rd. long and 20 rd. wide at \$120 an acre?<br>9. How many cubic feet of wood will a bin hold if it is $12\frac{1}{2}$ ft. long, $8\frac{1}{4}$ ft. wide, and $6\frac{3}{4}$ ft. deep? How many cords? |
|--|---|

10. A dealer bought apples at the rate of  $\frac{3}{4}$  pk. for 30¢ and sold them at 7¢ a quart. How much did he make on  $2\frac{1}{4}$  bu.?

## LXVII

Oral.

Rapidly add :

135	164	264	157	189	451	187	194	287	294	156
<u>124</u>	<u>127</u>	<u>137</u>	<u>123</u>	<u>139</u>	<u>267</u>	<u>136</u>	<u>137</u>	<u>156</u>	<u>287</u>	<u>136</u>

How many degrees are there in the circumference of a circle? in  $\frac{1}{2}$  of the circumference? in  $\frac{1}{4}$ ? Draw a circle on the blackboard and divide it into 4 equal parts. What is the line called that passes through the center and terminates at the circumference? What is  $\frac{1}{2}$  of the line called? What kind of angles are formed by drawing one

diameter of a circle horizontally and one vertically? How many degrees are there in each angle? How many degrees are there in every right angle?

1. If the diameter of a circle is 42 ft., what is the radius?

2. If the radius of a circle is 24 in., how long is the diameter?

3. How many degrees are there in  $\frac{3}{4}$  of the circumference of any circle?

4. How many minutes (') are there in a degree? How many seconds (") are there in a minute?

5. In 3 yd. and 1 ft., how many inches are there?

Rapidly add :

254	247	493	378	316	294	493	254	359	183	142
149	136	119	123	225	186	127	249	139	124	113

6. In 2 min. and 5 sec., how many seconds are there?

7. What part of the circumference of a circle is 1 degree ( $^{\circ}$ )?  $6^{\circ}$ ?  $9^{\circ}$ ?

8. What decimal part of a degree is 12 min.?

9. How many quarts are there in 6 gal. and 3 qt.?

10. A boy had  $\$ \frac{3}{4}$  and gave away  $\frac{2}{3}$  of it. How many cents did he give away? How many cents had he left?

Written.

1. Reduce  $17^{\circ} 16' 25''$  to seconds.

2. Find the sum of  $15^{\circ} 3' 20''$ ,  $19^{\circ} 15' 30''$ ,  $28^{\circ} 17' 50''$ ,  $45^{\circ} 30' 25''$ .

3. What part of a degree is 24 sec.?

4. A man's income this year is \$2700, which is  $\frac{1}{4}$  more than it was last year. How much was last year's income?

5. A wagon that sold for \$285 was bought for \$240. What part of the cost was the gain?

6. How many seconds are there in  $56^{\circ} 18' 32''$ ?

7. Reduce 72 yd. 2 ft. 11 in. to inches.

8. A tailor buys a piece of cloth for \$77 $\frac{1}{2}$  and finds that it is  $\frac{1}{4}$  more than he paid last year for the same material. What was the price last year?

9. What number is that which by being increased by  $\frac{5}{8}$  of itself will equal 65?

10. If  $\frac{7}{12}$  of a farm is valued at \$4733 $\frac{4}{5}$ , what is the value of the whole farm?

### LXVIII

#### Oral.

Rapidly subtract:

540	980	860	730	650	840	890	980	760	650	840
<u>270</u>	<u>430</u>	<u>350</u>	<u>240</u>	<u>370</u>	<u>450</u>	<u>440</u>	<u>430</u>	<u>490</u>	<u>590</u>	<u>750</u>

How much is  $\frac{1}{8}$  less than  $\frac{3}{8}$ ? How much is  $\frac{1}{4}$  less than a unit?  $\frac{1}{8}$  less than a unit?  $\frac{1}{8}$  less than  $\frac{3}{8}$ ?

If a number is  $\frac{1}{8}$  less than another number, how many eighths of the other number is it?

If 21 is  $\frac{1}{8}$  less than a certain number, what is the number?

If 15 is  $\frac{1}{6}$  less than a certain number, how many sixths of the number is 15? What is the number?

1. If \$25 is  $\frac{1}{6}$  less than what I paid for my watch, how much did my watch cost me?

2. Mr. Brown sold his farm for \$3000, which was  $\frac{1}{6}$  less than the amount he paid for it. How much did he pay for it? What part of the cost did he lose? How much did he lose?

3. 48 is  $\frac{1}{7}$  less than what number?

4. 48 is  $\frac{1}{7}$  more than what number?

5. When  $\frac{3}{4}$  of a yard of lace costs 60 ¢, how much will  $10\frac{1}{2}$  yd. cost?

Rapidly subtract:

---

960	790	620	650	460	650	960	840	640	860	430
870	340	430	430	230	380	420	270	350	720	190

How can a number be found when  $\frac{7}{8}$  of the number is known?

6. 63 is  $\frac{7}{8}$  of what number? How can a number be found when the number plus a part of it is known?

7. 63 is  $\frac{1}{8}$  more than what number?

How can a number be found when the number minus a part of it is known?

8. 63 is  $\frac{1}{8}$  less than what number?

9. 42 is  $\frac{1}{8}$  more than what number and  $\frac{1}{8}$  less than what number?

10. What number decreased by  $\frac{1}{8}$  of itself equals 72?

**Written.**

1. A man's income this year is \$2160, which is  $\frac{1}{8}$  less than it was last year. How much was last year's income?

2. A wagon was sold for \$285, which was  $\frac{2}{5}$  less than the cost of it. How much did the wagon cost?
3. What number decreased by  $\frac{5}{8}$  of itself equals 216?
4. What number decreased by  $\frac{2}{7}$  of itself equals 125?
5. At the rate of \$.16 $\frac{2}{3}$  a quire, how much will 10 reams of paper cost? \_\_\_\_\_
6. A number being increased by  $\frac{3}{8}$  of itself, the sum is 550. What is the number?
7. A house was sold for \$15670, which was  $\frac{3}{4}$  more than it cost. How much did it cost?
8. If 2 $\frac{1}{2}$  yd. cost \$7 $\frac{1}{2}$ , how many yards will \$21 $\frac{1}{4}$  buy?
9. If 3.8 lb. of sugar cost \$2.28, how much will 75 lb. cost?
10. If  $\frac{2}{7}$  of a number is 24, what is 2 $\frac{1}{2}$  times the number?

### LXIX

#### Oral.

Rapidly multiply:

27	14	15	25	18	17	45	19	21	13	15	13	16	15	14
3	6	7	4	2	3	6	4	9	7	8	6	8	9	7
<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>

Multiplying a number by 10 and then dividing it by 2 gives the same result as multiplying the same number by what number? Find the cost of 5 chairs at \$2.45 each.

Multiplying a number by 100 and then dividing it by 4 gives the same result as multiplying the same number by what number? At 16¢ a pound, how much do I have to pay for 25 lb. of butter?

Tell a short method of dividing a number by 5.

If the room rent of 5 people for 1 yr. amounted to \$640, what was the average rent a person?

Moving the decimal point two places to the *left* divides a number by what? Dividing a number by 100 and then multiplying the result by 4 gives the same result as dividing the number by what?

1.  $25 = \frac{?}{4}$ . To divide a number by 25 is to divide it by how many fourths?

2.  $1200 \div \frac{100}{4} = ?$   $1200 \div 25 = ?$

3. If in one round trip the total number of fares for 25 persons equals \$5, what is a single fare round trip?

4. If 25 turkeys weigh 450 lb., what is the average weight of each?

5. When  $\frac{1}{4}$  of the 84 gal. in a cask are drawn, how many gallons remain?

Rapidly multiply :

15	25	18	16	14	27	16	32	87	14	36	28	32	35	42
5	25	5	25	9	4	25	5	5	6	25	4	6	3	8
<hr/>														

6. How much will 16 lb. of coffee cost at 25¢ a pound?

7. Find the cost of 136 arithmetics at 75¢ each.

8. A real estate agent bought some property for \$2400 and sold it so as to gain  $33\frac{1}{3}\%$ . For how much did he sell it?

9. James paid 36¢ for a penknife, which he afterwards sold at a gain of  $16\frac{2}{3}\%$ . How much did he gain? For how much did he sell it?

10. My house cost me \$4000. For how much a year must I rent it to make  $12\frac{1}{2}\%$  on the cost?

**Written.**

1. Add:  $287\frac{1}{4}$   
 $315\frac{3}{8}$   
 $456\frac{1}{2}$   
 $389\frac{5}{8}$   
 $578\frac{3}{4}$   
 $645\frac{1}{4}$   
 $786\frac{1}{8}$   
 $462\frac{1}{2}$
2. If I pay \$62.25 for one wagon, how much shall I have to pay for 25 wagons?
3. If 25 persons make 8000 trips between New York and Brooklyn, what is the average number of trips made?
4. If the base of a triangle is 34 ft. 6 in. and the altitude 25 in., what is the area in square inches?
5. Find the area of a triangle the base of which is 33 ft. 4 in. and altitude, 18 ft. 6 in.
6. Add:  $587562$   
 $397654$   
 $123456$   
 $789123$   
 $378546$   
 $652894$   
 $786541$   
 $384569$
7. A lot 35 ft. by 100 ft. has on it a house 35 ft. by 45 ft. How many square feet are there left for a yard?
8. From 1.001 take .01009.
9. Reduce  $\frac{12542}{2854}$  to lowest terms.
10. Divide .007 by 3500.

**LXX****Oral.**

Rapidly multiply:

14	16	15	18	20	16	20	40	80	1.4	1.2	1.8
<u><math>1\frac{1}{2}</math></u>	<u><math>1\frac{1}{4}</math></u>	<u>1.5</u>	<u>2.5</u>	<u>1.25</u>	<u><math>\frac{3}{4}</math></u>	<u><math>\frac{4}{5}</math></u>	<u>.8</u>	<u>.6</u>	<u>3</u>	<u>7</u>	<u>6</u>

1. What part of 50 is 25? How many hundredths of 50 is 25?

2. 18 is what part of 24? How many hundredths of 24?

3. How many hundredths of 72 is 12? of 100 is 25?

4. I paid \$48 for a watch and sold it to gain \$16. What part of my cost is gain? How many hundredths?

5. At the rate of 2 apples for 3¢, how many apples can I buy for \$6?

Rapidly multiply :

18	20	20	60	16	.25	48	24	18	24	12	15
<u>1½</u>	<u>1½</u>	<u>.8</u>	<u>.3</u>	<u>2½</u>	<u>5</u>	<u>½</u>	<u>¾</u>	<u>.5</u>	<u>.25</u>	<u>.5</u>	<u>4</u>

6. I sold a cane for \$5 that cost me \$4. What part of the cost was the gain? how many hundredths of the cost?

7. I sold a book for 80¢ and gained 20¢. What part of the cost was gain? how many hundredths of the cost was the gain?

8. How many hundredths of 48 is 32? of 24 is 12? of 24 is 6?

9. 25 is  $\frac{1}{5}$  of what number?  $\frac{3}{5}$ ?  $\frac{4}{5}$ ?

10. 32 is .2 of what number? .4? .8?

Written.

1. What part of 120 is 15? How many hundredths of 120 is 15?

2. A merchant sold goods that cost \$2970 at a gain of  $33\frac{1}{3}\%$ . How much did he receive for the goods?

3. A, B, and C together own a mill. A owns  $\frac{1}{3}$  of it, B  $\frac{1}{3}$  of it. What part does C own? How much is C's share worth, if the mill is worth \$18,000?



4. A man who earns \$2400 spends \$1500. What part of his money does he save?

5. Reduce  $\frac{2\frac{1}{2} \div 4\frac{1}{2}}{8\frac{1}{2} - 3\frac{1}{2}}$  to a simple fraction.

6. Find the average daily wages paid in a factory where

5 men each earn \$2.69 a day.

8 men each earn \$3.50 a day.

12 men each earn \$2.90 a day.

18 men each earn \$3.00 a day.

7 men each earn \$3.25 a day.

7. What decimal part of 296 is 185?

8. Make out a properly receipted bill showing debtor and creditor, and giving suitable date and place: John Smith bought of Clark & Jones, 4 lb. beefsteak at 28¢; 12 lb. bacon at 32¢.

9. Divide 130.13 by 1100.

10. What is the area in square yards of a triangle the base of which is 75.64 yd. and altitude, 44.72 yd.?

## LXXI

### Oral.

Rapidly answer:

What decimal part of 6 is 3? of 8 is 4? of 24 is 12? of 24 is 6? of 16 is 4? of 15 is 5? of 7 is 2? of 12 is 4? of 8 is 7? of 2 is 1?

How many hundredths of 8 is 1? of 4 is 3? of 6 is 5? of 7 is 1? of 8 is 3? of 15 is 3? of 12 is 3? of 16 is 2? of 6 is 2? of 5 is 4?

What per cent of 20 is 6? of 14 is 7? of 18 is 8? of 16 is 1? of 8 is 5? of 16 is 10? of 48 is 6? of 48 is 12? of 10 is 2? of 1 is 2?

1. Twelve is what per cent of 72?
2. Mary had 108 chickens ; but 9 of them died. What per cent of them died?
3.  $\frac{1}{2}$  of 14 is what per cent of 42?
4. I had 25¢ and spent 15¢. What per cent of my money did I save?
5. What per cent is gained if I buy an article for 12¢ and sell it for 14¢?

Rapidly answer :

15 is what per cent of 75? 10 is what per cent of 75?  
8 is what per cent of 16? 32 is what per cent of 64?  
12 is what per cent of 36? 8 is what per cent of 10?  
8 is what per cent of 24? of 16? of 32? of 48? of 72?  
of 56?

6. Robert spelled 18 words correctly out of 20. What per cent did he have right?
7. What per cent loss is there if I sell goods for 12¢ a yard that cost 15¢?
8. I had 24 yd. of cloth and sold 9 yd. What per cent of my cloth did I have left?
9. 15 is  $\frac{1}{4}$  more than what number?
10. 15 is  $\frac{1}{4}$  less than what number?

Written.

1. A man is 48 yr. old and his son is 28 yr. younger. What per cent of the father's age is the son's?
2. What per cent of 296 is 185?

3. A man who earns \$2400 spends \$1500. What per cent of his money does he spend?

4. A dealer bought 432 sheep at \$7 each, and afterwards sold them to gain  $8\frac{1}{3}\%$ . How much did he receive for them?

5. Find the value of  $\frac{4\frac{1}{2} \times 8\frac{1}{2} \times 6\frac{1}{2}}{15\frac{3}{4} \div 2\frac{3}{4}}$ .

6. A house was sold for \$9680. It cost \$8470. What per cent was gained?

7. What per cent of 225 is 55?

8. If a man owes \$1680 and pays  $66\frac{2}{3}\%$  of his debt, how much does he still owe?

9. A man owning a house worth \$13800 sold it at a gain of  $16\frac{2}{3}\%$ . How much did he get for it?

10. If  $5\frac{1}{2}$  yd. velvet cost \$24.75, how much will  $\frac{1}{4}$  of a yard be worth?

## LXXII

### Oral.

Rapidly find the quotient:

$1 \div \frac{2}{3}$ ;  $1 \div \frac{7}{8}$ ;  $1 \div \frac{5}{6}$ ;  $2 \div \frac{3}{4}$ ;  $2 \div \frac{7}{8}$ ;  $2 \div \frac{5}{6}$ ;  $3 \div \frac{2}{3}$ ;  $3 \div \frac{3}{4}$ ;  
 $4 \div \frac{4}{5}$ ;  $5 \div \frac{5}{6}$ ;  $4 \div \frac{8}{9}$ ;  $2 \div \frac{6}{7}$ ;  $2 \div \frac{3}{5}$ ;  $1 \div \frac{6}{7}$ ;  $3 \div \frac{6}{7}$ ;  $1 \div \frac{1}{4}$ .

What decimal part of 2 is 1? What decimal part of  $\frac{3}{2}$  is 1? What decimal part of  $\frac{5}{4}$  is 1?

What per cent of 3 is 1? What per cent of  $\frac{3}{2}$  is 1? of  $\frac{2}{3}$  is 1? of  $\frac{1}{2}$  is 1? of  $\frac{1}{3}$  is 1? of  $\frac{3}{4}$  is 1? of  $\frac{5}{2}$  is 1? of  $\frac{2}{5}$  is 1? What per cent of 5 is 4? of  $\frac{4}{5}$  is 1? of  $\frac{4}{3}$  is 2? of  $\frac{4}{5}$  is 3?

1. 3 is what per cent of 4? 3 is what per cent of  $\frac{1}{4}$ ?

2. What per cent of  $\$ \frac{3}{4}$  is \$6?

3. What per cent of \$6 is \$ $\frac{3}{4}$ ?
4. James had \$ $\frac{4}{5}$  and his sister had \$2. What per cent of the amount of James's money did his sister have? What per cent of the amount of his sister's money did James have?
5. A boy paid 25 ¢ for a knife and sold it for 30 ¢. What part of the cost did he gain? What per cent?

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Rapidly find the quotient :

$1 \div \frac{1}{5}$ ;  $4 \div \frac{1}{5}$ ;  $4 \div \frac{3}{5}$ ;  $1 \div \frac{4}{5}$ ;  $2 \div \frac{4}{5}$ ;  $8 \div \frac{4}{5}$ ;  $6 \div \frac{3}{5}$ ;  $1 \div \frac{3}{4}$ ;  
 $3 \div \frac{3}{4}$ ;  $6 \div \frac{3}{4}$ ;  $12 \div \frac{3}{4}$ ;  $1 \div \frac{1}{2}$ ;  $2 \div \frac{1}{2}$ ;  $4 \div \frac{1}{2}$ ;  $16 \div \frac{1}{2}$ ;  $24 \div \frac{1}{2}$ .

6. A watch bought for \$20 was sold for \$25. What was the gain per cent?
7. A shawl bought for \$5 was sold for \$8. What was the gain per cent?
8. A boy bought a boat for \$20 and sold it for \$16. What part of the cost was loss? What per cent did he lose?
9. Mary sold a dress for \$6, thereby gaining \$2. What per cent did she gain?
10. A dealer bought a horse for \$150, and sold it for  $\frac{2}{3}$  of the cost. What per cent did he lose? \*

Written.

1. What per cent of 56 gal. is 7 gal.?
2. What per cent of  $\frac{7}{8}$  is 14? of  $5\frac{5}{8}$  is 5?
3. What per cent of  $17\frac{1}{2}$  is 7? of  $87\frac{1}{2}$  is 15?

COST      S. P.      LOSS

\*SUGGESTION:  $\frac{2}{3} - \frac{1}{3} = \frac{1}{3} = ?\%$

4. A regiment went into battle with 600 men and came out with 320 men. What per cent was lost?

5. If I have 4000 A. of land, and I sell 140 A., what per cent of my land do I keep?

6. What per cent of 500 bu. is  $77\frac{1}{2}$  bu.?

7. If \$52.50 is paid for the use of \$750, what is the rate per cent?

8. A merchant failing in business owes \$15120; he has \$9828. What per cent of his debts can he pay?

9. What per cent of 15 mi. is 10.99 mi.?

10. A farmer after building  $\frac{3}{4}$  mi. of fence at a cost of \$.75 a rod, had  $37\frac{1}{2}\%$  of it destroyed by fire. What was his loss?

### LXXIII

#### Oral.

Rapidly find the quotients:

$1 \div \frac{1}{2}$ ;  $2 \div \frac{1}{3}$ ;  $\frac{1}{2} \div \frac{1}{3}$ ;  $\frac{1}{2} \div \frac{1}{4}$ ;  $\frac{1}{2} \div \frac{1}{5}$ ;  $\frac{1}{4} \div \frac{1}{2}$ ;  $\frac{1}{4} \div \frac{1}{3}$ ;  
 $\frac{1}{4} \div \frac{1}{5}$ ;  $\frac{1}{3} \div \frac{1}{2}$ ;  $\frac{1}{3} \div \frac{1}{3}$ ;  $\frac{1}{5} \div \frac{1}{2}$ ;  $\frac{1}{5} \div \frac{1}{4}$ ;  $\frac{2}{3} \div \frac{1}{2}$ ;  $\frac{2}{3} \div \frac{1}{4}$ .

What part of 5 is 2? What part of 5 is  $\frac{1}{2}$ ?

What decimal part of 6 is  $\frac{1}{2}$ ? of 5 is  $\frac{1}{4}$ ? of 6 is  $\frac{1}{3}$ ? of 8 is  $\frac{3}{4}$ ? of 9 is  $\frac{2}{3}$ ?

What per cent of 2 is 1? of 1 is 2? of 3 is 2? of 4 is  $\frac{1}{2}$ ? of  $\frac{1}{2}$  is  $\frac{1}{2}$ ? of  $\frac{1}{2}$  is  $\frac{1}{4}$ ? of  $\frac{1}{4}$  is  $\frac{1}{2}$ ? of  $\frac{1}{3}$  is  $\frac{1}{3}$ ? of  $\frac{1}{3}$  is  $\frac{1}{6}$ ? of  $\frac{1}{6}$  is  $\frac{1}{3}$ ? of  $\frac{1}{6}$  is  $\frac{1}{6}$ ?

1. What per cent of  $\frac{1}{4}$  is  $\frac{1}{8}$ ?

2.  $\frac{1}{10}$  is what per cent of  $\frac{1}{2}$ ?

3.  $\frac{2}{16}$  is what per cent of  $\frac{3}{4}$ ?

4.  $\frac{2}{3}$  of \$6 is what per cent of  $\frac{4}{5}$  of \$50?
5. Ten per cent of \$300 is  $\frac{2}{5}$  of what I paid for my watch. How much did my watch cost me?

Rapidly answer :

$$\frac{2}{3} \div \frac{2}{3}; \quad \frac{3}{4} \div \frac{1}{2}; \quad \frac{5}{8} \div \frac{1}{4}; \quad \frac{8}{9} \div \frac{1}{3}; \quad \frac{1}{2} \div \frac{2}{3}; \quad \frac{3}{4} \div \frac{2}{3}; \quad \frac{2}{3} \div \frac{3}{4};$$

$$4 \div 1\frac{1}{3}; \quad 6 \div 1\frac{1}{2}; \quad \frac{6}{7} \div \frac{2}{3}; \quad \frac{2}{5} \div \frac{6}{7}; \quad \frac{4}{5} \div \frac{2}{3}; \quad \frac{2}{3} \div \frac{4}{5}; \quad 1 \div \frac{5}{8}.$$

6. What per cent of  $\frac{2}{5}$  is  $\frac{3}{8}$ ?
7.  $\frac{3}{4}$  is what per cent of  $\frac{1}{2}$ ?  $\frac{1}{2}$  is what per cent of  $\frac{3}{4}$ ?  
 $\frac{5}{8}$  is what per cent of  $\frac{5}{8}$ ?
8. A gain of \$3 upon goods that cost \$15 is what per cent gain?
9. By selling a suit for \$24, a dealer made \$8. What per cent did he make?
10. My house cost me \$8000. For how much a year must I rent it to make  $12\frac{1}{2}\%$  on the value of the house?

Written. .

1. What per cent of 13 qt. is  $3\frac{1}{4}$  qt.?
2. What per cent of  $4\frac{1}{2}$  is  $\frac{3}{4}$ ?
3.  $2\frac{1}{2}$  rd. is what per cent of  $12\frac{1}{2}$  rd.?
4. What per cent of 75 is 4.5? of 75 is 45? of 7.5 is 4.5?
5. From a hogshead containing 600 lb. of sugar, a grocer sold  $\frac{1}{4}$  of it at one time, and  $\frac{1}{3}$  of the remainder at another time. What per cent of the whole remained?

6. A man earned \$375 and saved \$75. What per cent of his money did he save?

7. A man who earns \$2400 spends \$1500. What per cent of his money does he save?

8. What per cent of 15 gal. is  $5\frac{1}{4}$  gal.?

9. What per cent of 5 gal. is 3 qt. 1 pt.?

10. Multiply 4.96 by .175.

### LXXIV

#### Oral

Rapidly find the quotient:

$$\begin{array}{r} 2 \overline{)4.2} \quad 2 \overline{)4.5} \quad 2 \overline{)4.9} \quad 4 \overline{).32} \quad 4 \overline{)3.2} \quad 4 \overline{)3.2} \\ 4 \overline{).32} \quad 10 \overline{)43.2} \quad 14 \overline{)14.2} \quad 41 \overline{)14.2} \quad 3 \overline{)27.} \quad 3 \overline{)27.} \end{array}$$

1. If a yard of velvet costs \$4, what part of a yard can I buy for \$ $\frac{1}{4}$ ?

2. If 3 men can do a piece of work in  $4\frac{1}{2}$  da., how long at the same rate will it take 12 men to do the work?

3. A watch costs \$30, and  $\frac{1}{2}$  of its cost is  $\frac{1}{3}$  of the cost of a chain. What is the cost of the chain?

4. A shirt bought for \$5 was sold at a gain of 25%. For how much was it sold?

5. Robert sold his horse for \$150, which was  $\frac{1}{2}$  of what he paid for it. What per cent did he lose?

Rapidly find the quotient:

$$\begin{array}{r} 3 \overline{)15} \quad 30 \overline{)15} \quad 300 \overline{)15} \quad 3 \overline{)15} \quad .03 \overline{)15} \quad .003 \overline{)15} \\ 3 \overline{)15} \quad 30 \overline{)15} \quad 300 \overline{)15} \quad 3 \overline{)15} \quad .03 \overline{)15} \quad .3 \overline{)0.015} \end{array}$$

6. A merchant purchased 20 bu. of flour for \$50, and sold them at a loss of 20%. What was the average selling price of a barrel?

7. 8 % of \$200 is  $\frac{2}{5}$  of the price James paid for his watch. He sold it so as to gain 25 %. For how much did he sell it ?

8. What per cent of  $\frac{4}{5}$  is  $\frac{1}{10}$ ?

9.  $\frac{1}{2}$  of 10 % is what per cent of 20 %?

10. I sold a yard of muslin for 12¢ and gained 2¢. What per cent did I gain?

### Written.

1. A man having 360 sheep takes 80 % of them to market. How many sheep has he left?

2. If a man walks at the rate of  $5\frac{1}{4}$  mi. in 1 hr., how many miles at the same rate can he walk in  $6\frac{2}{3}$  hr.?

3. Joseph is 12 yr. old. Two thirds of his age is  $\frac{2}{3}$  of John's age. How old is John?

4. Divide  $7\frac{1}{2}$  hundredths by 3000.

5. I had 200 bu. and sold  $28\frac{2}{3}$  bu. What per cent of the original quantity remained?

6.  $\frac{1}{2}$  of 108 is what per cent of  $\frac{1}{2}$  of 198?

7. How many sheets of paper are there in  $25\frac{1}{2}$  reams?

8. Simplify  $\frac{4\frac{2}{3}}{6\frac{10}{11}}$ .

9. What is the area in square yards of a triangle the base of which is 75.64 yd. and the altitude, 44.76 yd.?

10. If a man can complete a certain piece of work in  $14\frac{2}{3}$  da., what per cent of it could he finish at the same rate in  $4\frac{8}{9}$  da.?



## LXXV

## Oral.

Rapidly answer :

12 is  $\frac{2}{3}$  of what number? 18 is  $\frac{2}{3}$  of what number? 16 is  $\frac{2}{3}$  of what number? 24 is  $\frac{1}{2}$  more than what number? 36 is  $\frac{1}{2}$  more than what number? 14 is  $\frac{1}{2}$  more than what number? 14 is  $\frac{2}{3}$  more than what number? 21 is  $\frac{2}{3}$  more than what number? 25 is  $\frac{1}{2}$  less than what number? 25 is  $\frac{2}{3}$  less than what number?

1. 12 is  $\frac{1}{2} + \frac{1}{2}$  less than what number?
2. A pole stands  $\frac{1}{2}$  in mud and  $\frac{1}{2}$  in water, while 20 ft. of it is in the air. What is the length of the pole? (State the solution of this problem.)
3.  $\frac{1}{2}$  in. plus  $\frac{1}{4}$  in. lacks how much of being 1 in.? (State the solution of this problem.)
4. A man spent  $\frac{2}{3}$  of his money for a horse, and then had \$60 remaining. How much had he at first?
5. Mary gave  $\frac{1}{2}$  of her money for silk and  $\frac{1}{2}$  for satin, and had \$10 left. How much money had she at first?

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Rapidly answer :

36 is  $\frac{1}{2}$  more than what number?  $\frac{1}{2}$  less?  $\frac{1}{2}$  more?  $\frac{1}{2}$  less?  
 $\frac{1}{2}$  more?  $\frac{1}{2}$  less?  $\frac{1}{2}$  less?  $\frac{1}{2}$  less?  $\frac{2}{3}$  more?  $\frac{1}{2} + \frac{1}{2}$  less?  
 $\frac{1}{2} - \frac{1}{2}$  more? 48 is  $\frac{1}{2}$  more than what number?  $\frac{2}{3}$  less?  $\frac{2}{3}$  more?  $\frac{1}{2}$  less?  $\frac{1}{2}$  more?  $\frac{1}{2}$  less?  $\frac{2}{3}$  more?  $\frac{1}{2} + \frac{1}{2}$  less?

6. If  $\frac{1}{2}$  of an army were killed,  $\frac{1}{2}$  taken prisoners, and 100 escaped, how many men were there in the army?
7. John's money increased by  $\frac{1}{2}$  and  $\frac{1}{2}$  of it equals \$44. How much money has he? (Analyze the solution.)

8. Henry's money decreased by  $\frac{1}{3}$  and  $\frac{1}{4}$  of it equals \$25. How much money has he?

9.  $\frac{1}{3}$  ft. plus  $\frac{1}{5}$  ft. lacks how much of being 1 ft.? (Analyze the solution.)

10.  $\frac{1}{3}$  of the length of a pole is in the air,  $\frac{1}{4}$  in the water, and 10 ft. in the ground. What is the length of the pole?

**Written.**

1. A man spent  $\frac{1}{3}$  of his money for a coat,  $\frac{1}{8}$  of it for a hat,  $\frac{1}{8}$  of it for shoes, and had \$19.50 left. How much money had he at first?

2. A pole stands  $\frac{1}{3}$  in mud,  $\frac{2}{3}$  in water, and the rest, 39 ft., is in the air. What is the length of the pole? (Make a diagram.)

3. After spending  $\frac{1}{3}$  of my money, and losing  $\frac{1}{6}$  of the remainder, I have \$30 left. How much had I at first?

4. John gave away  $\frac{2}{3}$  of his marbles, lost  $\frac{1}{4}$  of the remainder, and had 60 marbles left. How many did he have at first?

5. A field is 17.45 rd. long and 9.8 rd. wide. How many acres are there in the field?

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6. A farmer sold  $\frac{1}{3}$  of his wheat to one man,  $\frac{1}{4}$  to another, and had 485 bu. left. How many bushels had he at first? How much was all of his wheat worth at 86¢ a bushel?

7. If  $\frac{5}{7}$  of one number is 675 and  $\frac{2}{3}$  of another number is 498, what is the sum of the two numbers?

8. A man bequeathed to his wife \$35000, which was  $\frac{1}{6}$  of his estate. If the remainder of the estate was divided equally among his five children, how much did each child receive?

9. Mrs. Jones spent  $\frac{1}{4}$  of her money for furniture,  $\frac{1}{5}$  of it for a dress, and had \$60.50 left. How much money did she have at first? How much money did she spend?

10. Simplify  $\frac{2\frac{1}{2} + (\frac{3}{4} + \frac{1}{2})}{3\frac{1}{2} - (\frac{1}{2} \times 2\frac{1}{4})}$ .

## LXXVI

## Oral.

	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$	
✓						Rapidly find, first the sums, then the products: *
✓						If a man can do a piece of work in 4 da., how much of it can he do in 1 da. at this rate? If a man can do a piece of work in 5 da., how much of it can he do in 1 da.? If he works 7 da., how much can he do in 1 da.? If A can do a piece of work in 4 da., and B in 3 da., how much can they both do in 1 da.? If A can do a piece of work in 3 da., and B in 5 da., how much can they both do in 1 da.?
✓						
✓						
✓						
✓						
✓						

\* Diagrams like the above should be placed on the blackboard. As the teacher passes or a square, the pupil should give the corresponding answer.

If A can do  $\frac{1}{5}$  of his work in 1 da., how long will it take him to do all of it at this rate? if he can do  $\frac{1}{4}$  of it? if he can do  $\frac{2}{5}$  of it? if he can do  $\frac{3}{5}$  of it? if he can do  $\frac{3}{4}$  of it? if he can do  $\frac{5}{6}$  of it?  $\frac{5}{6}$  is contained how many times in 1?  $\frac{7}{8}$  in 1?  $\frac{3}{4}$  in 1?  $\frac{4}{5}$  in 1?

1. A can do a piece of work in 2 da., and B in 3 da. How long, at these rates, will it take them if they both work together?

2. A can do a piece of work in 3 da., and B in 4 da. How long, at these rates, will it take them both working together?

3. One man can do a certain piece of work in 5 da., and another can do the same work in 2 da. How long will it take them together?

4.  $\frac{3}{4}$  of 8% is what per cent of 30%?

5. A merchant sold 20% of 50 bbl. of flour. How many barrels of flour remained?

Rapidly find, first the sums, then the differences, then the products, and lastly the quotients (using in turn  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{6}$  as subtrahend and divisor).

6. A man can build  $\frac{3}{5}$  of a boat in a week. How long will it take him to build the whole boat?

7. A can do a piece of work in 3 da., and B in 6 da. What part of the work can each do in 1 da.?

$+$ $\times$	$-$ $\div$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{2}{5}$	$\frac{3}{5}$
$\frac{1}{3}$						
$\frac{1}{4}$						
$\frac{1}{5}$						
$\frac{1}{6}$						

8. If A can do a piece of work in 3 da. and B in 5 da., how much can they together do in 1 da.?

9. If A and B can do  $\frac{1}{2}$  of a piece of work in 1 da., how long will it take them to do the whole work?

10. A can dig a ditch in 5 da. and B in 6 da. How long will it take them working together?

**Written.**

1. C can make a wall in 4 da., and D in 7 da. In what time can they do it working together? \*

2. A can reap a field in 6 da., and B in 8 da. How long will it take them working together?

3. A can do a piece of work in 3 da., B in 4 da., and C in 6 da. How long will it take them if they all work together?

4. A cistern has 2 pipes, by the first of which it may be filled in 12 hr., and by the second in  $\frac{2}{3}$  of that time. How long will it take both running at the same time to fill it?

5. The product of two factors is 38.9008. One of them is .523. What is the other?

6. A can dig a ditch in 6 da., and B in 7 da. How long will it take them if they work together?

7. If 64 T. of iron cost \$4816, how many tons of iron can be bought for \$1730.75?

\* SUGGESTION:  $\frac{1}{4}$  of the work = the amount of work done by C in 1 da.  
 $\frac{1}{7}$  of the work = the amount of work done by D in 1 da.

$\frac{1}{4}$  of the work +  $\frac{1}{7}$  of the work =  $\frac{11}{28}$  of the work = the amount of work done by both in 1 da.

$\frac{28}{11}$  of the work  $\div$   $\frac{11}{28}$  of the work = ?

8. A barrel of flour will last one family 3 mo., another family 4 mo., and another family 5 mo. How long would the barrel last if it were used for the three families together?

9. A cistern has 3 pipes. The first will fill it in 5 hr., the second in 6 hr., and the third in 8 hr. If all the pipes are opened at 8 o'clock in the morning, at what time should the cistern be filled?

10. A wagon was sold for \$285, which was  $\frac{2}{3}$  less than it cost. How much did it cost?

## LXXVII

Oral.

Rapidly add:

456	345	643	314	465	456	456	438	342	265	523
<u>123</u>	<u>213</u>	<u>125</u>	<u>223</u>	<u>312</u>	<u>300</u>	<u>310</u>	<u>312</u>	<u>106</u>	<u>134</u>	<u>247</u>

1. Two thirds of a pole is in the air,  $\frac{1}{3}$  of it is in water, and the rest is in mud. If 50 ft. of the pole is in air and water together, how long is the pole? (Make a diagram.)

2. A florist sold  $\frac{5}{8}$  of his roses, and still had 40. How many roses had he at first?

3. What per cent of  $\frac{5}{8}$  is  $\frac{1}{4}$ ?

4. Reduce  $\frac{3}{4}$  to a decimal;  $.04\frac{1}{4}$  to a pure decimal;  $.3\frac{3}{8}$  to a pure decimal.

5. Add 4 E., 4 d., 4 ¢.

Rapidly add:

368	487	548	376	563	627	813	642	454	328	483
<u>134</u>	<u>243</u>	<u>435</u>	<u>128</u>	<u>356</u>	<u>349</u>	<u>297</u>	<u>468</u>	<u>273</u>	<u>267</u>	<u>249</u>

4. A regiment went into battle with 600 men and came out with 320 men. What per cent was lost?

5. If I have 4000 A. of land, and I sell 140 A., what per cent of my land do I keep?

6. What per cent of 500 bu. is  $77\frac{1}{2}$  bu.?

7. If \$52.50 is paid for the use of \$750, what is the rate per cent?

8. A merchant failing in business owes \$15120; he has \$9828. What per cent of his debts can he pay?

9. What per cent of 15 mi. is 10.99 mi.?

10. A farmer after building  $\frac{3}{4}$  mi. of fence at a cost of \$.75 a rod, had  $37\frac{1}{2}\%$  of it destroyed by fire. What was his loss?

### LXXIII

#### Oral.

Rapidly find the quotients:

$1 \div \frac{1}{3}$ ;  $2 \div \frac{1}{3}$ ;  $\frac{1}{2} \div \frac{1}{3}$ ;  $\frac{1}{2} \div \frac{1}{4}$ ;  $\frac{1}{2} \div \frac{1}{5}$ ;  $\frac{1}{2} \div \frac{1}{2}$ ;  $\frac{1}{4} \div \frac{1}{3}$ ;  
 $\frac{1}{4} \div \frac{1}{5}$ ;  $\frac{1}{3} \div \frac{1}{2}$ ;  $\frac{1}{3} \div \frac{1}{3}$ ;  $\frac{1}{5} \div \frac{1}{2}$ ;  $\frac{1}{5} \div \frac{1}{4}$ ;  $\frac{2}{3} \div \frac{1}{2}$ ;  $\frac{2}{3} \div \frac{1}{4}$ .

What part of 5 is 2? What part of 5 is  $\frac{1}{2}$ ?

What decimal part of 6 is  $\frac{1}{2}$ ? of 5 is  $\frac{1}{4}$ ? of 6 is  $\frac{1}{3}$ ? of 8 is  $\frac{2}{3}$ ? of 9 is  $\frac{2}{3}$ ?

What per cent of 2 is 1? of 1 is 2? of 3 is 2? of 4 is  $\frac{1}{2}$ ? of  $\frac{1}{2}$  is  $\frac{1}{2}$ ? of  $\frac{1}{2}$  is  $\frac{1}{4}$ ? of  $\frac{1}{4}$  is  $\frac{1}{2}$ ? of  $\frac{1}{3}$  is  $\frac{1}{3}$ ? of  $\frac{1}{3}$  is  $\frac{1}{6}$ ? of  $\frac{1}{6}$  is  $\frac{1}{3}$ ? of  $\frac{1}{6}$  is  $\frac{1}{9}$ ?

1. What per cent of  $\frac{1}{4}$  is  $\frac{1}{8}$ ?

2.  $\frac{1}{10}$  is what per cent of  $\frac{1}{2}$ ?

3.  $\frac{3}{18}$  is what per cent of  $\frac{3}{4}$ ?

4.  $\frac{2}{3}$  of \$6 is what per cent of  $\frac{4}{5}$  of \$50?
5. Ten per cent of \$300 is  $\frac{2}{5}$  of what I paid for my watch. How much did my watch cost me?

Rapidly answer :

$$\frac{1}{3} \div \frac{2}{3}; \quad \frac{3}{4} \div \frac{1}{2}; \quad \frac{5}{8} \div \frac{1}{4}; \quad \frac{3}{5} \div \frac{1}{3}; \quad \frac{1}{2} \div \frac{2}{3}; \quad \frac{3}{4} \div \frac{2}{3}; \quad \frac{2}{3} \div \frac{3}{4};$$

$$4 \div 1\frac{1}{3}; \quad 6 \div 1\frac{1}{2}; \quad \frac{6}{7} \div \frac{2}{3}; \quad \frac{2}{3} \div \frac{6}{7}; \quad \frac{4}{5} \div \frac{2}{3}; \quad \frac{2}{3} \div \frac{4}{5}; \quad 1 \div \frac{5}{8}.$$

6. What per cent of  $\frac{3}{5}$  is  $\frac{2}{3}$ ?
7.  $\frac{3}{4}$  is what per cent of  $\frac{1}{2}$ ?  $\frac{1}{2}$  is what per cent of  $\frac{3}{4}$ ?  $\frac{5}{8}$  is what per cent of  $\frac{5}{8}$ ?
8. A gain of \$3 upon goods that cost \$15 is what per cent gain?
9. By selling a suit for \$24, a dealer made \$8. What per cent did he make?
10. My house cost me \$8000. For how much a year must I rent it to make  $12\frac{1}{2}\%$  on the value of the house?

Written. .

1. What per cent of 13 qt. is  $3\frac{1}{4}$  qt.?
2. What per cent of  $4\frac{1}{5}$  is  $\frac{3}{4}$ ?
3.  $2\frac{1}{2}$  rd. is what per cent of  $12\frac{1}{2}$  rd.?
4. What per cent of 75 is 4.5? of 75 is 45? of 7.5 is 4.5?
5. From a hoghead containing 600 lb. of sugar, a grocer sold  $\frac{1}{4}$  of it at one time, and  $\frac{1}{3}$  of the remainder at another time. What per cent of the whole remained?
6. A man earned \$375 and saved \$75. What per cent of his money did he save?



8. What decimal part of an ounce is 5 pwt.?
9. What will be the value of the metal in a gold chain weighing 2 oz. at \$1.25 a pennyweight?
10. If .04 of an acre costs \$8, how much will an acre cost?

**Written.**

1.  $67\frac{1}{9} + 29\frac{1}{8} = ?$        $92\frac{1}{4} - 37\frac{3}{8} = ?$        $27 \times 14\frac{3}{8} = ?$   
 $32\frac{3}{8} \times 85 = ?$        $13\frac{4}{5} \div 5\frac{3}{4} = ?$        $65\frac{5}{8} - 15\frac{1}{8} = ?$
  2. Find the difference between 1. and .000001;  $3\frac{1}{2}$  and .0003 $\frac{1}{2}$ .
  3. B has 725 A.  $2\frac{3}{8}$  times B's equals  $3\frac{5}{8}$  times C's. How many acres has C?
  4. Mr. Mann bought a tract of land for \$6500, and sold  $\frac{3}{8}$  of it to Mr. Chase and  $\frac{5}{8}$  of the remainder to Mr. Colburn. What was the value of the remainder?
  5.  $.002 \times 3.01 = ?$        $4\frac{7}{8} \times .01375 = ?$
- 
6. From  $.6\frac{1}{4}$  take  $.287\frac{3}{8}$ ; from  $.7\frac{5}{8}$  take  $.345\frac{1}{8}$ .
  7. If the dividend is  $16\frac{1}{4}$  and the divisor is .125, what is the quotient?
  8. How much will 16.2 yd. of silk cost when  $18\frac{1}{2}$  yd. cost \$40.70?
  9. Divide 7.5 by 15.
  10. Divide .007 by 3500.

**LXXIX****Oral.**

Rapidly multiply, first 1.2, then .12, then .014, then .008, by each of the following numbers:  
 4; .2; .03; .6; .05.

1. Reduce  $\frac{7}{50}$  to a decimal fraction.  
Reduce 1.25 to millionths.  
Reduce .01600 to lowest decimal terms.  
Reduce  $.3\frac{2}{5}$  to a pure decimal.
2. What part of 12 is  $2\frac{1}{3}$ ?
3. If  $\frac{3}{4}$  yd. of cloth costs  $\$ \frac{1}{2}$ , how much will  $\frac{5}{8}$  yd. cost?
4.  $.13\frac{1}{2}$  equals what common fraction?
5. What is the sum of  $2\frac{1}{2}$  and .06?

—

Rapidly multiply:

15	2.3	.06	1.4	.27	.018	5.6	4.8	.19	.007	.050	3.5
<u>4</u>	<u>2</u>	<u>7</u>	<u>6</u>	<u>.3</u>	<u>4</u>	<u>.2</u>	<u>.3</u>	<u>.03</u>	<u>.6</u>	<u>9</u>	<u>.08</u>

6. Add  $2\frac{1}{2}$  eagles and 20 dimes.
7. Find the sum of  $.6\frac{1}{2}$  and  $\frac{1}{2}$ .
8. If  $\frac{3}{8}$  of \$40 is twice the amount I gave for a coat, how much did the coat cost?
9. From  $\frac{1}{3}$  take .002.
10. A man owned  $\frac{7}{8}$  of a steam mill and sold  $\frac{1}{8}$  of his share. What part of the mill does he still own?

Written.

1. If  $\frac{2}{3}$  of a farm is worth \$9000, how much is  $\frac{5}{12}$  of it worth?
2. If  $\frac{3}{8}$  of a farm is valued at  $\$1729\frac{1}{2}$ , what is the value of  $\frac{2}{3}$  of the farm?
3. Reduce  $\frac{2}{17}$  to a decimal.

4. A man at his death left his wife \$12500, which was  $\frac{1}{2}$  of  $\frac{5}{8}$  of his estate. At her death she left  $\frac{5}{7}$  of her share to her daughter. What part of the father's estate did the daughter receive?

5. A dealer sold 7 bbl. of apples for \$32 $\frac{1}{2}$ , which was  $\frac{5}{8}$  as much as he received for all he had left, at \$4 a barrel. How many barrels in all did he sell?

6. Find the sum of 103.60 $\frac{1}{2}$ , 6.0 $\frac{7}{8}$ , .37, and 40.0034 $\frac{1}{8}$ .

7. From what number must 3 $\frac{5}{8}$  be taken to leave 5 $\frac{1}{8}$ ?

8. Reduce .06 $\frac{1}{2}$  to a common fraction.

9. If  $\frac{3}{4}$  of 9 bu. of wheat cost \$13 $\frac{1}{2}$ , how much should  $\frac{7}{8}$  of a bushel cost?

10. Find the difference between .000014 and 1.4.

### LXXX

#### Oral.

Rapidly divide, first 1.2, then .12, then .012, then 1.40, then .014, by each of the following numbers :

2; 20; 200; .02.

1. A man owned  $\frac{8}{9}$  of a farm and sold  $\frac{3}{8}$  of his share. What part of his share does he still own? What part of the farm does he still own?

2. From  $\frac{1}{3}$  take .020.

4. Divide .25 by 2500.

3. What is  $\frac{1}{3}$  of .04?

5.  $\frac{1}{4}$  is what per cent of  $\frac{3}{4}$ ?

Rapidly divide :

$$\begin{array}{r}
 30 \overline{) .06} \quad 3 \overline{) .006} \quad .03 \overline{) 6} \quad 4 \overline{) .008} \quad .4 \overline{) .012} \quad 40 \overline{) .012} \\
 400 \overline{) .012} \quad 30 \overline{) .375} \quad 300 \overline{) 2.4} \quad 5 \overline{) .25} \quad .5 \overline{) 2.5} \quad .05 \overline{) .025} \\
 50 \overline{) .025} \quad 50 \overline{) .25} \quad 500 \overline{) .25} \quad 60 \overline{) .36} \quad .6 \overline{) 3.6} \quad .06 \overline{) .036}
 \end{array}$$

6. 56 is .875 of what number?
7. In a school of 480 pupils  $6\frac{1}{4}\%$  of the pupils were absent on a certain holiday. How many were present?
8. Find  $.12\frac{1}{2}$  of  $\frac{3}{4}$ .
9. 12 is 2.5 times what number?
10.  $\frac{2}{3}$  is what per cent of  $\frac{3}{5}$ ?

**Written.**

1. A dealer bought 24000 ft. of lumber at \$15.90 per M, and retailed it at \$2 $\frac{1}{4}$  per C. How much did he gain?
  2. 45.5 is .025 of what number?
  3. A man had \$64000. He lost  $37\frac{1}{2}\%$  of it. How much money did he have left?
  4.  $37\frac{1}{2}\%$  of a lot of dry goods valued at \$8000 was destroyed by fire. How much would a creditor lose who owned 15 % of the entire lot?
  5. How much will 5 lb. 9 oz. 14 pwt. of gold dust be worth at 75 ¢ a pennyweight?
- 
6. If .075 of an acre costs \$4 $\frac{1}{2}$ , find the cost of one acre.
  7. The dividend being  $18\frac{1}{2}$ , and the divisor .0025, find the quotient.
  8. Find  $\frac{3}{4}$  of .0225.
  9. Find .085 of 85000.
  10. A druggist bought 54 gal. of oil for \$72.90 and lost 6 gal. of it by leakage. He sold the remainder at \$1.70 per gallon. How much did he gain?

## FIFTH MONTH

### GENERAL REVIEW

#### LXXXI

##### Oral.

Rapidly find :

$\frac{1}{5}$ of 35	$\frac{1}{7}$ of 49	$\frac{1}{8}$ of 48	$\frac{2}{3}$ of 21	$\frac{6}{7}$ of 63	$\frac{2}{3}$ of 81
$\frac{1}{6}$ of 30	$\frac{1}{7}$ of 84	$\frac{1}{9}$ of 54	$\frac{4}{5}$ of 45	$\frac{2}{7}$ of 56	$\frac{7}{9}$ of 54
$\frac{1}{6}$ of 54	$\frac{1}{7}$ of 63	$\frac{1}{9}$ of 63	$\frac{2}{5}$ of 35	$\frac{5}{8}$ of 32	$\frac{8}{9}$ of 72
$\frac{1}{6}$ of 42	$\frac{1}{7}$ of 56	$\frac{1}{10}$ of 90	$\frac{5}{8}$ of 36	$\frac{3}{8}$ of 64	$\frac{7}{10}$ of 70
$\frac{1}{7}$ of 42	$\frac{1}{8}$ of 56	$\frac{1}{10}$ of 70	$\frac{2}{7}$ of 42	$\frac{1}{8}$ of 40	$\frac{1}{12}$ of 48

- How many pencils are there in 3 gross?
- How many sheets of paper are there in  $\frac{1}{2}$  a ream?
- How much must I pay for 8 gross of copy books at 10¢ apiece?
- If a boy walks  $\frac{1}{2}$  mi. in 10 min., how long will it take him at that rate to walk 12 mi.?
- At 25¢ a pound, how many pounds of cheese can be bought for \$5?

Rapidly answer:

$\frac{1}{4} = \frac{?}{16}$	$\frac{3}{4} = \frac{?}{36}$	$\frac{2}{5} = \frac{?}{45}$	$\frac{1}{2} = \frac{?}{100}$	$\frac{3}{4} = \frac{?}{100}$	$\frac{4}{5} = \frac{?}{100}$
$\frac{5}{8} = \frac{?}{24}$	$\frac{3}{5} = \frac{?}{60}$	$\frac{3}{8} = \frac{?}{64}$	$\frac{1}{3} = \frac{?}{100}$	$\frac{3}{4} = \frac{?}{100}$	$\frac{1}{8} = \frac{?}{100}$
$\frac{5}{6} = \frac{?}{48}$	$\frac{7}{8} = \frac{?}{40}$	$\frac{5}{7} = \frac{?}{49}$	$\frac{1}{6} = \frac{?}{100}$	$\frac{5}{6} = \frac{?}{100}$	$\frac{1}{7} = \frac{?}{100}$
$\frac{2}{3} = \frac{?}{72}$	$\frac{1}{7} = \frac{?}{56}$	$\frac{1}{3} = \frac{?}{57}$	$\frac{1}{5} = \frac{?}{100}$	$\frac{2}{5} = \frac{?}{100}$	$\frac{1}{12} = \frac{?}{100}$
$\frac{4}{5} = \frac{?}{80}$	$\frac{2}{7} = \frac{?}{28}$	$\frac{5}{6} = \frac{?}{36}$	$\frac{1}{4} = \frac{?}{100}$	$\frac{3}{5} = \frac{?}{100}$	$\frac{1}{16} = \frac{?}{100}$

Tell how to reduce a fraction to higher terms.

6. What number must be added to 38 to make 54?
7. What fraction must be added to  $\frac{2}{3}$  to make  $\frac{5}{6}$ ?
8. At \$1.25 a yard, how much will 36 yd. of broad-cloth cost?
9. A man had \$40 and gave away  $12\frac{1}{2}\%$  of it. How many dollars did he give away? How many dollars did he have left?
10. 75% of a class of 44 were promoted. How many were not promoted?

**Written.**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Add:     19.9<br/>          100.01<br/>          25.0756<br/>          1000.032525<br/>          487.56342<br/>          <u>89.3408</u></li> </ol> | <ol style="list-style-type: none"> <li>2. From 175.007<br/>   take    <u>59.0156</u></li> <li>3. Multiply 392.5 by 5.006.</li> <li>4. Divide 725.6 by 5.025.</li> <li>5. A man bought a horse for \$250<math>\frac{1}{4}</math> and sold it for \$325<math>\frac{1}{4}</math>. What per cent of the cost was his gain?</li> </ol> |
|--|---|

- 
6. Divide  $17\frac{5}{8}$  by 158;  $19\frac{5}{8}$  by  $\frac{3}{7}$ .
  7. A farmer sold  $\frac{1}{3}$  of his potatoes;  $\frac{1}{3}$  of them decayed, and  $\frac{1}{3}$  were eaten by his family. He had 56 bu. left. How many bushels had he at first?
  8. Simplify  $\frac{3}{4}$  of  $\frac{5}{6}$  of  $\frac{2}{3}$  of  $\frac{3}{5}$  of  $\frac{1}{8}$  of  $3\frac{1}{2}$ .
  9. A man earns \$11.70 in 2.6 da. How long will it take him to earn \$38.70?
  10.  $6\frac{3}{4}$  is what per cent of  $12\frac{1}{2}$ ?

**LXXXII****Oral.**

Rapidly find the answer, using the ratio method:

If 3 cost 5¢, 6 will cost —¢?

If 3 cost 5¢, 15 will cost —¢?

If 6 cost 10¢, 3 will cost —¢?

If 4 cost 12¢, — will cost 36¢?

If 8 cost 4¢, — will cost 24¢?

If 5 cost 14¢, — will cost 42¢?

1.  $18\frac{3}{4}\%$  of a number is what fraction of it?
2. If  $\frac{3}{4}$  yd. of silk is worth \$ $\frac{9}{10}$ , how much will  $\frac{5}{8}$  yd. be worth?
3. A man bought a horse for \$96. He sold it at a gain of  $8\frac{1}{3}\%$ . For how much did he sell it?
4. If  $\frac{3}{4}$  of my money equals 63¢, how much is  $\frac{1}{2}$  of it?
5. After spending  $\frac{2}{3}$  of his money, James has \$150 left. How much money did he have at first?

---

Rapidly answer as whole or mixed numbers:

$\frac{56}{8}$ ;  $1\frac{7}{8}$ ;  $\frac{15}{4}$ ;  $\frac{32}{4}$ ;  $\frac{20}{3}$ ;  $\frac{23}{4}$ ;  $\frac{49}{8}$ ;  $\frac{50}{4}$ ;  $1\frac{7}{4}$ ;  $\frac{23}{6}$ ;  $\frac{22}{9}$ ;  $1\frac{0}{8}$ ;  
 $\frac{25}{3}$ ;  $\frac{25}{6}$ ;  $\frac{63}{9}$ .

6. At the rate of  $\frac{2}{3}$  of a dozen for \$1, what is the price of 4 articles?
7. Four ounces of tea is what decimal part of a pound?
8. At 50¢ a day for board, how much will my board bill be for the month of July?

9. At 2 ¢ each, how many apples can be bought with 2 dimes and 2 nickels?

10. Add 14 ¢, 8 ¢, 10 ¢, and 12 ¢.

**Written.**

1. Reduce  $\frac{15}{8}$  to a decimal of 4 places.

2. Make out and receipt the following bill, showing debtor and creditor :

New York, Dec. 8, 1908, Seares Bros. sold to Mrs. W. Earl, 3 pr. gloves at \$1 $\frac{3}{4}$ , 1 $\frac{1}{4}$  yd. ribbon at \$.30, 16 yd. cambric at \$.06, 12 pr. socks at \$.25, 1 dress at \$3.75.

3. I bought 2 reams of paper at \$1.75 a ream and sold it at 18 ¢ per quire. How much did I gain?

4. What is the area in square feet of a triangular plot of ground having a base of 25 ft. and an altitude of 20 ft.? (Make a diagram.)

5. Simplify  $\frac{7}{8}$  of  $\frac{16}{3}$ .

6. A farmer having 450 bu. of wheat sold  $\frac{5}{8}$  of it at 85 ¢ a bushel, and the remainder at 92 ¢ a bushel. How much did he receive for his wheat?

7. I had \$450 and spent 60 % of it. How many dollars had I left?

8.  $34.2 \times .875 \div .678 = ?$

9. If 2 $\frac{1}{2}$  yd. cost \$7 $\frac{1}{2}$ , how many yards will \$2 $\frac{1}{4}$  buy?

10. A coal dealer had 254 $\frac{1}{8}$  T. of coal. He sold to one person 29 $\frac{7}{8}$  T., to another 56 $\frac{3}{4}$  T., and to another 14 $\frac{3}{8}$  T. How many tons did he have left?



**LXXXIII****Oral.**

Rapidly give the values in hundredths or per cent :

$\frac{5}{8}$ ;  $\frac{1}{7}$ ;  $\frac{5}{6}$ ;  $\frac{1}{2}$ ;  $\frac{2}{3}$ ;  $\frac{3}{4}$ ;  $\frac{1}{4}$ ;  $\frac{2}{5}$ ;  $\frac{5}{5}$ ;  $\frac{1}{6}$ ;  $\frac{1}{12}$ ;  $1\frac{1}{2}$ ;  $1\frac{1}{4}$ ;  $1\frac{2}{5}$ ;  $\frac{7}{8}$ ;  
 $\frac{3}{7}$ ;  $\frac{2}{8}$ ;  $1\frac{3}{4}$ ;  $\frac{2}{3}$ ;  $\frac{3}{4}$ .

How many pecks are there in a bushel? How many quarts are there in a bushel? How many pints are there in a bushel? Repeat the table of dry measure.

1. What per cent of a bushel is 4 qt.?
2. How many times can a quart cup be filled from a bushel of walnuts?
3. Reduce  $\frac{2}{3}$  of  $\frac{9}{10}$  to a decimal.
4. I paid \$24 for my watch and  $\frac{1}{2} + \frac{2}{3}$  of this is 4 times what I paid for the chain. What was the cost of the chain?
5. A boy having 36 marbles lost  $\frac{3}{4}$  of them and then found  $\frac{5}{8}$  as many as he had at first. How many had he then?

---

Rapidly find :

What per cent is 5 of 20? 5 of 2? 7 of 14?  $\frac{1}{2}$  of  $\frac{1}{3}$ ?  $\frac{1}{2}$  of  $\frac{1}{4}$ ? 2 of 1? 3 of 1?  $2\frac{1}{2}$  of  $1\frac{1}{4}$ ?  $\frac{2}{3}$  of  $\frac{3}{4}$ ?  $\frac{1}{4}$  of  $\frac{1}{8}$ ? 24 of 72?

How many quarts are there in a gallon? How many pints are there in a gallon? How many gills are there in a gallon? Compare 1 qt. and 1 pt. ; 1 gal. and 1 pt. Repeat the table of liquid measure.

6. How many  $\frac{1}{2}$ -pt. cups can be made from 8 qt.?
7. How much will a gallon of oil cost at 2¢ a pint?
8. Reduce  $.07\frac{1}{2}$  to a common fraction.

9. If  $\frac{3}{4}$  yd. is worth \$ $\frac{9}{10}$ , how much will  $\frac{5}{8}$  yd. be worth?

10. \$60 is  $\frac{2}{3}$  of what B gave for a horse, and the cost of the horse increased by  $\frac{2}{3}$  of itself is 5 times what he paid for a sleigh. Find the cost of the sleigh.

**Written.**

1. A grocer bought a cask of oil containing 51 gal. 2 qt. 1 pt. It originally contained 63 gal. How much leaked out?

2. At 5¢ a pint, how much will 8 bu. 2 pk. 2 qt. 1 pt. of peanuts cost?

3. At \$12.50 per ton, what is the cost of a load of hay weighing 1875 lb.?

4. What decimal part of a bushel is 3 pk. and 2 qt.?

5. How much will it cost to excavate a cellar 64 ft. long, 46 ft. wide, and 12 ft. deep, at 25¢ per cubic yard?

---

6. Add 37 bu. 1 pk. 3 qt., 41 bu. 2 pk. 5 qt., 35 bu. 1 pk. 3 qt., 3 pk. 7 qt.

7. A milkman buys milk at 4¢ a quart and sells it at 28¢ a gallon. Find his gain on 37 gal. 3 qt.

8. If .125 bu. costs 16¢, how much will a bushel cost?

9. A drover bought 140 calves for \$700. For how much must he sell them per head to gain \$84?

10. What is the cost of 10 gal. 3 qt. of milk at 4¢ a pint?

## LXXXIV

Oral.

Rapidly multiply each of the following, first by 5, then by 25, using a short method :

16; 25; 320; 48; 36; 72; 160; .72; .048; 480; .60; 6.25; 625; 62.5; 10.80.

How many ounces are there in a pound Troy?

How many pennyweight are there in a pound Troy?

How many grains are there in a pound Troy? Compare an ounce with a grain. Repeat the table of Troy weight.

1. If .04 of an acre costs \$16, how much will an acre cost?

2. How much will 4500 bricks cost at \$8 per M?

3. Find  $.06\frac{1}{4}$  of 32.

4. When \$4 $\frac{3}{8}$  is paid for  $\frac{3}{8}$  of a cord of wood, what is the price per cord?

5. If \$24 is  $\frac{1}{6}$  more money than I have, how much have I?

---

Rapidly answer as improper fractions :

5 $\frac{1}{2}$ ; 3 $\frac{1}{2}$ ; 7 $\frac{3}{8}$ ; 6 $\frac{1}{4}$ ; 5 $\frac{3}{8}$ ; 8 $\frac{3}{4}$ ; 9 $\frac{3}{8}$ ; 7 $\frac{1}{2}$ ; 6 $\frac{3}{8}$ ; 5 $\frac{1}{8}$ ; 3 $\frac{7}{8}$ ; 12 $\frac{1}{2}$ ; 12 $\frac{3}{4}$ ; 8 $\frac{5}{8}$ ; 9 $\frac{3}{4}$ .

How many hundredweight equal a ton? How many pounds are there in a hundredweight? How many ounces are there in a pound? How many ounces are there in a ton? Repeat the table of avoirdupois weight.

6. Divide 12 by .04.

7. What is  $.08\frac{1}{8}$  of 96?

8. At \$3 per 1000 ft., what is the cost of 2625 ft. of lumber?

9. If 6.2 yd. cost \$12.40, how much will 1 yd. cost?

10. What part of 16 is  $\frac{7}{8}$ ?

### Written.

1. A farmer sold a load of hay weighing 1 T. 15 cwt. at \$14 per ton. How much did he receive for the load?

2. If  $\frac{1}{4}$  cwt. of beef costs \$2.50, how much will 872 lb. cost?

3. How much will a gold chain weighing 2 oz. 12 pwt. cost at \$2 $\frac{1}{2}$  a pennyweight?

4. A carriage that cost \$264 was sold at a loss of 16 $\frac{2}{3}$ %. For what sum was it sold?

5. Mr. Smith sold a village lot for \$900, gaining \$100 on the sale. How much did it cost? What was the per cent of gain?

6. Add: 34567      7. A farmer divided his farm  
82498      among his four sons, giving to each  
28615      the following number of acres: to the  
34872      first he gave 29 $\frac{7}{12}$  A.; to the second,  
93946      150 $\frac{1}{2}$  A.; to the third, 41 $\frac{1}{2}$  A.; and  
12345      to the fourth, 69 $\frac{3}{4}$  A. How many  
67891      acres were there in the farm?

23456      8. Find the cost of 26500 lb. of  
78901      hay at \$11.50 a ton.

23456      9. A coal dealer divided 7 $\frac{1}{2}$  T. of  
coal among several poor families, giving to each  $\frac{1}{8}$  T.  
How many families did he supply with this coal?

10. Mr. Chase sold a piano for \$275 $\frac{1}{2}$ , thereby gaining \$43 $\frac{1}{4}$ . How much did it cost him?

### LXXXV

#### Oral.

Rapidly reduce to lowest terms:

$\frac{20}{28}$ ;  $\frac{12}{18}$ ;  $\frac{15}{25}$ ;  $\frac{9}{27}$ ;  $\frac{12}{14}$ ;  $\frac{18}{24}$ ;  $\frac{27}{36}$ ;  $\frac{12}{17}$ ;  $\frac{15}{24}$ ;  $\frac{25}{30}$ ;  $\frac{26}{48}$ ;  $\frac{21}{24}$ ;  
 $\frac{10}{18}$ ;  $\frac{12}{17}$ ;  $\frac{14}{18}$ .

What is a fraction? What is the difference between a common fraction and a decimal fraction? What is meant by "the terms of a fraction"? When is a fraction in its lowest terms?

1. How much will  $\frac{5}{8}$  yd. of ribbon cost at \$ $\frac{4}{5}$  a yard?
2. If I pay \$800 for  $\frac{2}{3}$  of a lot, how much do I pay for  $\frac{3}{5}$  of the lot?
3. If 2.5 of an acre cost \$500, how much should .5 of an acre cost?
4. 72 is  $\frac{1}{4}$  more than what number?
5. 70 is  $\frac{1}{5}$  less than what number?

---

Rapidly reduce to the next lowest denomination:

5 bu.; 8 gal.; 2 lb. Troy; 5 T.; 8 bu.; 5 lb. Troy;  
 3 pk.; 10 oz. Troy; 9 qt.; 7 pwt.; 14 pk.; 9 gal.; 5  
 cwt.; 7 qt.; 6 bu.

Reduce the following to the lowest denomination of the same table:

2 bu.; 3 gal.; 1 lb. Troy; 1 lb. avoirdupois.

What is a denominate number? What is a concrete number? What is an abstract number?

6. At  $\$4\frac{1}{2}$  per M, how much will 3000 posts cost?
7. If 1200 apples cost  $\$6$ , what is the cost of 1 apple?
8. Find  $16\frac{2}{3}\%$  of  $\$12.36$ .
9. If 1.2 yd. of imported velvet cost  $\$24$ , how much will  $\frac{3}{4}$  yd. cost?
10.  $\frac{2}{3}$  is what per cent of  $\frac{5}{6}$ ?

**Written.**

Tell how to divide a fraction by a fraction.

1. Divide  $\frac{7}{8}$  by  $\frac{1}{4}$ .  
(Explain the process of inverting the divisor.)

Tell how to divide a decimal by a decimal.

2. Divide .0992 by .32.
3. If  $7\frac{1}{2}$  bbl. of pork cost  $\$60$ , how many barrels can be bought for  $\$156$ , at the same rate?
4. If 2.7 yd. of cloth cost  $\$3.24$ , how many yards can I buy for  $\$7.20$ ?
5. If  $3\frac{2}{3}$  lb. of sugar cost  $\$.33$ , what will be the cost of  $65\frac{1}{2}$  lb.?

---

6. How many pounds of tea at  $\$7$  a pound will pay for  $10\frac{1}{2}$  baskets of peaches at  $\$1\frac{2}{5}$  a basket?

7. A can do a certain piece of work in 8 da., and B can do the same piece of work in 6 da. In what time can both do it?

8. If 48 is  $\frac{3}{8}$  of some number, what is  $\frac{3}{4}$  of the same number?

9.  $(\frac{2}{5} \times 14) \div (\frac{1}{3} \text{ of } 15) = ?$

10. 
$$\frac{\$1260 \times 3.49}{\$10.47 - (\$850 \div 6.80)} = ?$$

## LXXXVI

## Oral.

Rapidly give the per cent equivalents of :

$\frac{1}{2}$ ;  $\frac{1}{4}$ ;  $\frac{3}{4}$ ;  $\frac{1}{8}$ ;  $\frac{3}{8}$ ;  $\frac{5}{8}$ ;  $\frac{7}{8}$ ;  $\frac{8}{8}$ ;  $\frac{1}{8}$ ;  $\frac{2}{8}$ ;  $\frac{3}{8}$ ;  $\frac{1}{7}$ ;  $\frac{2}{7}$ ;  $\frac{3}{7}$ ;  $\frac{4}{7}$ ;  
 $\frac{5}{7}$ ;  $\frac{6}{7}$ ;  $\frac{7}{7}$ ;  $\frac{1}{6}$ ;  $\frac{5}{6}$ ;  $\frac{6}{6}$ ;  $\frac{1}{5}$ ;  $\frac{2}{5}$ ;  $\frac{3}{5}$ ;  $\frac{4}{5}$ ;  $\frac{5}{5}$ ;  $\frac{1}{12}$ ;  $\frac{5}{12}$ ;  $\frac{7}{12}$ ;  $\frac{11}{12}$ ;  
 $\frac{12}{12}$ ;  $\frac{1}{9}$ ;  $\frac{2}{9}$ ;  $\frac{4}{9}$ ;  $\frac{5}{9}$ ;  $\frac{7}{9}$ ;  $\frac{8}{9}$ ;  $\frac{9}{9}$ .

1. Find the value of :

$72 + 6$ ,  $- 64 + 8$ ,  $- 3$ ;  $6 \times 8$ ,  $+ 4$ ,  $+ 4$ ;  $7 + 9$ ,  $+ 4$ ,  
 $+ 9$ ,  $\times 2$ ,  $- 12$ ,  $+ 7$ .

2.  $7 \times 7$ ,  $+ 1$ ,  $\div 5$ ,  $\times 8$ ,  $+ 5 = ?$

3. If 18 yd. of cloth cost \$54, for how much must it be sold per yard to gain \$36?

4. If 12 lb. of cheese cost 108¢, how much will 36 lb. cost? (Analyze the solution.)

5. A man who had \$100 said that  $\frac{3}{4}$  of his money was 5 times his week's wages. How much did he earn a week? (Analyze the solution.)

Rapidly answer :

96 divided by 3; 4; 8; 32; 16; 6; 12; 24; 48.

98 divided by 2; 7; 14; 49.

63 divided by 9; 3; 7; 21.

48 divided by 8; 4; 6; 2; 24; 3; 16.

54 divided by 6; 3; 9; 27.

6.  $8 + 4$ ,  $- 7$ ,  $+ 6$ ,  $- 8 \div 3 = ?$

7.  $5 \times 12$ ,  $+ 3$ ,  $\div 7$ ,  $\times 8$ ,  $- 5 = ?$

8. If a bushel of wheat costs \$ $\frac{4}{5}$ , and a bushel of corn costs \$ $\frac{3}{4}$ , what is the difference in the cost of 5 bu. of each?

9. By selling sheep for \$12 apiece,  $\frac{1}{4}$  of the cost is lost. What is the cost?

10. Multiply 24 by  $.66\frac{2}{3}$ ; 48 by  $.37\frac{1}{2}$ ; 36 by  $.83\frac{1}{3}$ .

**Written.**

1. A dealer exchanged  $10\frac{3}{4}$  cd. of wood at \$4 $\frac{1}{2}$  a cord for 7.75 bbl. flour. How much was the flour worth a barrel?

2. A farmer sold a cow for \$51 and received in payment 12 yd. cloth at \$3 $\frac{1}{2}$  a yard, and the balance in tea at 60¢ a pound. How many pounds of tea did he receive?

3. What is  $\frac{3}{8}$  of .0003?

4. Find the difference between  $7\frac{5}{8}$  units and  $7\frac{5}{8}$  thousandths.

5. Divide .952 by .7 and multiply the quotient by .0025.

---

6. A grocer laying in a stock of goods invested  $\frac{1}{3}$  of his money in flour,  $\frac{1}{4}$  in sugar and molasses,  $\frac{1}{12}$  in tea and coffee, and the remainder, \$540, in sundry other groceries. How much was the whole amount invested?

7. A farmer stored  $\frac{1}{5}$  of his oats in 1 bin,  $\frac{1}{4}$  in another,  $\frac{1}{6}$  in another, and the remainder, 276 bu., he put in a fourth bin. How many bushels of oats had he?

8. From  $.7\frac{3}{8}$  take  $.0065\frac{1}{3}$ .

9. How much will 1 T. of iron cost if .015 T. is worth \$4 $\frac{1}{2}$ ?

10. Find the difference between 33% of 90 and .003.



## LXXXVII

## Oral.

Rapidly answer:

24 is  $\frac{1}{2}$  of what number? .5 of what number?  $\frac{3}{4}$ ? .25?  
 $33\frac{1}{3}\%$ ? .6? 80%? .2?  $\frac{2}{3}$ ?  $\frac{5}{8}$ ?  $.14\frac{2}{7}$ ?  $\frac{1}{12}$ ?  $\frac{1}{8}$  less than  
 what number?  $\frac{1}{8}$  more? 25% less?

Find  $\frac{3}{4}$  of 90;  $\frac{4}{5}$  of 70;  $\frac{1}{2}$  of 64;  $12\frac{1}{2}\%$  of 80; of 24;  
 of 36; of 48;  $37\frac{1}{2}\%$  of 72; 80; 96; of 88;  $83\frac{1}{3}\%$  of 24;  
 36; 48; 72; 96.

How many shillings are there in a pound sterling? How  
 many pence are there in a pound sterling? How many  
 farthings? What part of a shilling is a penny? Repeat  
 the table of English money.

1. What per cent of a pound sterling (£) is 12 d.?
2. At 5s. a pair, how much must I pay in English  
 money for 20 pairs of shoes?
3. 80 far. is what decimal part of a pound sterling?
4. At \$1.50 each, how much will 48 chairs cost?
5. At 50¢ a bushel, how many bushels of oats can be  
 bought for \$16 $\frac{1}{2}$ ?

Rapidly find the quotient:

24 ÷ .2; 1.2 ÷ .2; .24 ÷ 4; .24 ÷ 40; 6 ÷ 300;  
 .06 ÷ .3; .4 ÷ 200; 16 ÷ 400; .16 ÷ 4; 24 ÷ .37 $\frac{1}{2}$ ;  
 .36 ÷ .33 $\frac{1}{3}$ ; 18 ÷ .66 $\frac{2}{3}$ ; 2 ÷ .83 $\frac{1}{3}$ ; 20 ÷ .83 $\frac{1}{3}$ ; 200 ÷ .83 $\frac{1}{3}$ .

How many ounces are there in the pound weight used  
 by a druggist? How many drams are there in 1 oz.?  
 scruples in 1 dr.? grains in 1 scruple? What is the  
 weight used by druggists in mixing medicines called?

Repeat the table. Tell the value of a pound apothecaries' weight in ounces, drams, scruples, and grains.

6. How many pills of 4 gr. each can be made from 2 dr. 2 sc. of calomel?

7. At \$2.25 a pair, what is the cost of 12 pairs of shoes?

8. How many pounds of raisins, at the rate of  $16\frac{2}{3}$ ¢ a pound, can be bought for \$5?

9. If 800 oranges cost \$4, what is the cost of 1?

10. If 4 apples cost 7¢, how many can be bought for \$35?

#### Written.

1. What is the value of  $\frac{5}{16}$  of  $(2\frac{4}{7} + 6\frac{5}{8}) \times (9\frac{5}{9} + 4\frac{6}{7})$ ?

2. What is the value of  $\frac{12\frac{1}{2}}{\frac{4}{7}} + \frac{\frac{2}{3} \text{ of } \frac{3}{4}}{\frac{1}{2}}$ ?

3. What is the value of  $7.1 \times 8.2, - 34\frac{3}{4} \div 2.5$ ?

4. What is the value of  $(714 - .714) \div (.34 - .034)$ ?

5. Using your name as the debtor, and some dry-goods firm's name as the creditor, make out the following bill:  
7 yd. broadcloth at \$3.60, 9 yd. satin at \$1.12 $\frac{1}{2}$ , 12 yd. lining silk at \$.90, and 24 yd. cassimere at \$1.37 $\frac{1}{2}$ .

6. Add: \$ 469.37

2009.16

317.48

69.17

709.69

42.39

4689.74

870.09

58.65

7. A man owns  $\frac{3}{8}$  of a factory and sells  $\frac{1}{4}$  of his share for \$8500.

What is the value of the factory?

8. If  $\frac{7}{8}$  of my money is \$3612, how much money have I?

9. A man owning  $\frac{1}{16}$  of a ship worth \$48064 sold  $\frac{1}{4}$  of his share.

What part of the ship did he sell?

What part does he still own, and what is his part worth?



How many sheets of paper equal a quire? How many quires equal a ream? How many reams are there to a bale? How many sheets of paper equal a ream? Repeat the miscellaneous table.

6. How much will  $\frac{3}{4}$  of a ream of paper cost at 5¢ a quire?

7. How many rods are there around a field  $\frac{1}{4}$  mi. square?

8. At 10¢ a square yard, how much will it cost to paint a ceiling 20 ft. long and 18 ft. wide?

9. A grocer sold me 6 qt. and 1 pt. of berries. What part of a peck did he sell me?

10. John worked 45 min. at the rate of 40¢ an hour. How much did he earn?

**Written.**

1. If the Atlantic cable is 3500 mi. in length, and if it cost 20¢ a foot to lay it, what was the entire cost?

2. How many acres are there in a field 80 rd. long and 32 rd. wide?

3. How much will a field 180 rd. long and 60 rd. wide cost at \$75 an acre?

4. A field contains 24 A. and is 60 rd. wide. How long is it?

5. At  $62\frac{1}{2}$ ¢ a rod, how much will it cost to fence the field in example 4?

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6. A rectangular corner field of a farm is 80 rd. long and contains 20 A. How wide is it?

7. At \$1.25 a rod, how much will it cost to fence a rectangular piece of ground 63.5 rd. long and 35.75 rd. wide?

8. Mr. Brown sold a portion of his farm in the shape of a triangle, the base of which measured 40 rd. and the altitude, 30 rd. How many acres were there in the piece he sold?

9. A road 72 ft. wide and  $\frac{1}{2}$  mi. long contains how much land?

10. A man has a farm in the shape of a rectangle,  $201\frac{3}{4}$  rd. long and  $41\frac{1}{4}$  rd. wide. How many acres does it contain?

### LXXXIX

#### Oral.

Rapidly subtract:

375	678	256	532	487	620	4100	8500	875	720	695
<u>250</u>	<u>420</u>	<u>130</u>	<u>350</u>	<u>260</u>	<u>480</u>	<u>2700</u>	<u>3700</u>	<u>490</u>	<u>380</u>	<u>420</u>

An inch is what part of a yard? Two feet is what per cent of a yard? Eight inches is what per cent of a foot? Nine inches is what per cent of a yard?

1. At 10¢ a quart, how much will a fruit dealer get for 2.5 bu. cherries?

2. A can do a piece of work in 2 da. and B in 4 da. How long will it take them if they work together?

3. If  $.33\frac{1}{3}$  yd. of cloth is worth \$1.20, how much will 2 yd. cost?

4. At \$4 per M, how much will 8250 bricks cost? 12500 bricks?

5. If the divisor is 60, and the dividend is 2.4, what is the quotient?

---

Rapidly subtract :

560	725	867	738	765	687	350	633	655	742	856
<u>380</u>	<u>320</u>	<u>580</u>	<u>480</u>	<u>380</u>	<u>490</u>	<u>190</u>	<u>270</u>	<u>470</u>	<u>560</u>	<u>370</u>

6. If a young man spends  $\$2\frac{1}{2}$  a month for tobacco, in what time, at this rate, will he spend  $\$7\frac{1}{2}$ ?
7. In .07 how many thousandths are there?
8. What is the sum of  $.6\frac{1}{2}$  and 3.50?
9. At  $\$6$  a ton, what would be the price of 3500 lb.?
10. If 3500 lb. cost  $\$7$ , what is the price per ton?

Written.

1. The cotton crop in Tennessee in one year amounted to 290000 bales, and the next year to 350000 bales. What was the per cent of increase?
  2. In Louisiana the cotton crop in one year was 700000 bales, and in the next year, 508000 bales. What was the per cent of decrease?
  3. In one year the cotton crop of Florida was 75000 bales, which was  $\frac{1}{8}$  less than it was the next year. How many bales were in the crop the second year?
  4. If a man owes  $\$5280$ , and pays  $33\frac{1}{3}\%$  of his debt, how much remains unpaid?
  5. I had  $\$10720$ . I invested 25 % of it in land, and  $12\frac{1}{2}\%$  of the remainder in fencing the land. How much of the money remained?
- 
6. Two men engaged in trade, each with  $\$3540$ . One of them gained  $33\frac{1}{3}\%$  of his capital, and the other gained 60 %. How much more did the one gain than the other?

7. The average ocean freight rate on cotton from the United States to Liverpool is 32¢ per 100 lb. ; the railway freight rate from the shipping point to all ports is 40¢ per 100 lb., and the cost of transportation from the farm to the shipping point is 16¢ per 100 lb. How much will it cost to ship 700000 bales of cotton from Memphis to Liverpool, counting 500 lb. to a bale ?

8. The bread made from a barrel of flour (196 lb.) weighs 35 % more than the flour. What is the weight of the bread ?

9. By referring to the 8th example, find how many loaves, each weighing 12 oz., can be made from a barrel of flour.

10. What per cent is  $\$6\frac{1}{4}$  of  $\$12\frac{1}{2}$  ?

### XC

#### Oral.

Rapidly answer :

$\frac{3}{10}$  of 40 = what % of 24 ?  $\frac{1}{6}$  of a farm is what % of it ?  $1\frac{1}{2}$  times a number is what % of it ? 8 hr. = what % of a day ?  $2\frac{1}{2}$  times a number is what % of it ? 3 times a number is what % of it ? What per cent of \$20 is \$5 ? of \$40 is \$30 ? of  $\frac{1}{2}$  is  $\frac{1}{4}$  ? of  $\frac{1}{6}$  is  $\frac{1}{3}$  ? of  $\frac{2}{3}$  is  $\frac{1}{4}$  ? of 25 pk. is 15 pk. ? of 1 bu. is 1 pk. ? of 1 pk. is 1 qt. ? of 1 lb. of sugar is 1 oz. ?

1. Jane having  $\frac{1}{2}$  yd. of silk, gave  $\frac{1}{4}$  of it to her sister. What part of a yard did she give away ? What part of a yard had she left ?

2. A man owning  $\frac{1}{2}$  of a farm sold  $\frac{1}{4}$  of his share to his brother. What part of the farm did each then own ?

3. John paid 48¢ for a knife, which he sold for 36¢. How much did he lose? What per cent did he lose?

4. A can do a piece of work in 2 da. and B in 3 da. If they both work together, how long will it take them to do it?

5. Seven is what per cent of 42?

Rapidly multiply :

29	15	16	18	19	27	56	82	84	52	45	36	60	80	72
<u>2</u>	<u>12</u>	<u>11</u>	<u>5</u>	<u>3</u>	<u>4</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>8</u>	<u>9</u>	<u>12</u>	<u>15</u>	<u>4</u>

6. A grocer bought a cask of cider.  $\frac{1}{4}$  of it leaked out,  $\frac{2}{3}$  of the remainder he sold, and what was left he kept for his own use. What part of the cask did he keep for his own use?

7. If a person's expenses are \$12 a week, how much will they be for  $9\frac{3}{4}$  weeks?

8. Multiply  $3\frac{1}{2}$  times 6 by  $\frac{1}{4}$  of 28.

9. What is  $6\frac{1}{4}\%$  of 800?

10. Divide .8 by 2000.

Written.

1. A man having a yearly income of —, spends — % of it the first year, — % of it the second year, and — % the third year. How much does he save in 3 yr.? (Pupils should supply the figures for the blank spaces.)

2. A grocer sold from a hogshead containing 600 lb. of sugar  $\frac{1}{4}$  of it one time and  $\frac{1}{3}$  of the remainder at another time. (Ask the question.)



3. What is the area of a square field, the perimeter of which is 560 rd. ? (Make a diagram.)

4. Find the cost of painting a roof 52 ft. long and 30 ft. wide, at \$.75 a square (100 sq. ft.).

5. In a room 32 ft.  $\times$  12 ft.  $\times$   $12\frac{1}{2}$  ft. there are 60 pupils, each breathing 10 cu. ft. of air in a minute. In what time will they breathe all the air in the room?

6. At \$21 per ton, how much will 2560 lb. cost?

7. From  $6.5\frac{2}{3}$  take  $.65\frac{1}{4}$ .

8. What will be the cost of carrying 893850 lb. of corn from Chicago to New York at \$.36 per 100 lb. ?

9. If  $\frac{2}{3}$  of 4 lb. cost \$2 $\frac{1}{2}$ , how many pounds of tea can be bought for \$7 $\frac{1}{2}$ ?

10.  $5.56 \times 8.2 + 2000 = ?$

### XCI

#### Oral.

$\begin{array}{c} + - \\ \times \div \end{array}$	12	.012	.12	1.6	.16
40					
400					
.4					
.04					
.004					

Rapidly find, first the sums, then the differences, then the products, and lastly the quotients (using in turn 40, 400, .4, .04, and .004 as divisor, and the larger number in each set as minuend).

1. What decimal part of  $\frac{5}{8}$  is  $\frac{1}{4}$ ? What per cent is it?

2. If 600 oranges cost \$3.60, how much will 25 oranges cost?

3. If  $\frac{3}{4}$  of 2 lb. of tea cost \$1 $\frac{1}{2}$ , how much will  $\frac{1}{4}$  of a pound cost?

4. What is  $.08\frac{1}{2}$  of  $.96$ ?
5. What per cent of  $\$25$  is  $\$1\frac{1}{2}$ ?

Rapidly find, first the sums, then the differences, then the products, and lastly the quotients (using in turn  $.6$ ,  $.06$ ,  $.006$ ,  $60$  and  $600$  as divisor, and the larger number in each set as minuend).

6. What is  $.16\frac{2}{3}$  of  $2.4$ ?

7.  $\frac{1}{4} = \frac{?}{100}$  of  $\frac{2}{3}$ ?

8. At a country store a farmer bought flannel worth  $\$1\frac{1}{4}$  a yard for 6 turkeys worth  $\$2\frac{1}{2}$  apiece. How many yards of flannel did he buy?

$\begin{array}{c} + \\ \times \\ \div \end{array}$	$7.2$	$.72$	$720$	$.072$	$.48$
$.6$					
$.06$					
$.006$					
$60$					
$600$					

9. A grocer paid  $\$4\frac{1}{2}$  for some onions at the rate of  $\$1\frac{1}{2}$  per bushel. How many bushels did he buy?
10. One fifth of a yard is what decimal part of  $15$  yd.?

#### Written.

1. One year 99 A. of land in New Hampshire was devoted to the production of tobacco, and  $\$24948$  was realized. Find the value of the yield per acre.
2. New York, the same year, produced  $7257975$  lb. of tobacco on  $6177$  A. How many pounds to an acre were produced?
3. How much will it cost to ship  $300$  bales of cotton from New Orleans to New York, the average weight being  $500$  lb. to the bale, and the freight being  $65\%$  a hundred?

4. If the 50 sheep on a certain farm are worth, on an average, \$5.50 apiece, what is the value of the share of a person who owns  $\frac{2}{3}$  of them?

5. Find the value of  $3.75 \times 2.5 \div .005$ .

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6. Find  $16\frac{2}{3}\%$  of 5280 ft.

7. A farmer who had 1408 sheep sold  $6\frac{1}{4}\%$  of the number. How many remained?

8. I bought 7 yd. of muslin at 18¢; 6 handkerchiefs at 25¢; 3 pairs of gloves at \$1.75; 12 sheets at 58¢; 16 yd. of silk at \$1.25. Make out the bill in proper form, giving your own names as the purchasers, and some dry goods firm's name as the creditor. Receipt the bill.

9. If the distance around a square is 18 ft. 8 in., what is the length of a side?

10. If each of your steps measures 2 ft., how far will you go in 720 steps?

## XCII

### Oral.

Rapidly find :

$\frac{1}{2}$ of 16	$\frac{2}{3}$ of 27	$\frac{3}{4}$ of 21	$\frac{4}{5}$ of 30	$\frac{5}{6}$ of 15	$\frac{7}{8}$ of 40
$\frac{3}{4}$ of 32	$\frac{4}{5}$ of 24	$\frac{5}{6}$ of 36	$\frac{1}{2}$ of 18	$\frac{1}{3}$ of 24	$\frac{3}{4}$ of 28
$\frac{2}{3}$ of 18	$\frac{5}{6}$ of 25	$\frac{7}{8}$ of 35	$\frac{4}{5}$ of 45	$\frac{5}{6}$ of 50	$\frac{7}{8}$ of 60

1. A grocer pays 36¢ a pound for tea and sells it for 45¢ a pound. What part of the cost is gain?

2. How many days are there from November 28 to Christmas?

3. At  $\$ \frac{3}{4}$  each, how many baseballs can be bought for \$8?

4. If 7 bbl. of flour cost \$42, what is the price of 21 bbl.?

5. If one boy takes 42 hr. to do a piece of work, how long will it take 7 boys, working at the same rate, to do it?

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Rapidly find:

$\frac{1}{3}$ of 54	$\frac{1}{4}$ of 48	$\frac{2}{3}$ of 60	$\frac{3}{4}$ of 72	$\frac{3}{4}$ of 56	$\frac{1}{8}$ of 24
$\frac{3}{8}$ of 32	$\frac{5}{8}$ of 56	$\frac{5}{8}$ of 72	$\frac{7}{8}$ of 64	$\frac{7}{8}$ of 96	$\frac{1}{8}$ of 24
$\frac{5}{8}$ of 30	$\frac{5}{8}$ of 72	$\frac{1}{7}$ of 21	$\frac{3}{7}$ of 28	$\frac{5}{7}$ of 42	$\frac{4}{7}$ of 49

6. What is the length of the perimeter of an equilateral triangle that measures 25 ft. on a side?

7. I have a triangular plot of ground, the base of which is 16 ft. and altitude 8 ft. How many square feet are there in the area?

8. Henry has 9 times as many marbles as James. He has 72 marbles. How many marbles has James?

9. If 56¢ is  $\frac{7}{8}$  of my money, how much money have I?

10. One man can mow a field of grass in 18 da. How long will it take 9 men to mow it?

**Written.**

1. According to the statistics of Savings Banks there was deposited one year to the credit of 226861 depositors in Maine, the amount of \$87677255.88. How much was the average deposit?

2. What per cent of  $87\frac{1}{2}$  is  $12\frac{1}{2}$ ?

3. A man purchased a block of land for \$250000, and paid in cash \$50000. What per cent of the purchase was his cash payment?

4. Find 25 % of \$3962 + 4 % of \$1272.

5.  $.048 + .06 \times .008 = ?$

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6. In one year there were produced in the United States 1717434543 bu. corn, and in another year 2668651000 bu. How many bushels of increase were there?

7. Divide 102 bu. 3 pk. by 4.

8. Reduce 2 yd. 2 ft. 7 in. to inches.

9. What part of a circle is an area of  $24^\circ 30'$ ?

10.  $87.5 \times (500 + .25) = ?$

### XCIII

Oral.

Rapidly give the cost of :

21 lb. @ $33\frac{1}{2}$ ¢	96 yd. @ $12\frac{1}{2}$ ¢	48 lb. @ $12\frac{1}{2}$ ¢
9 yd. @ 50 ¢	48 lb. @ 25 ¢	12 yd. @ $8\frac{1}{8}$ ¢
24 yd. @ $16\frac{2}{3}$ ¢	96 lb. @ 25 ¢	54 lb. @ $16\frac{2}{3}$ ¢
48 lb. @ $16\frac{2}{3}$ ¢	16 yd. @ 25 ¢	36 yd. @ $8\frac{1}{8}$ ¢
48 qt. @ $12\frac{1}{2}$ ¢	32 lb. @ $6\frac{1}{4}$ ¢	32 bu. @ 25 ¢
72 lb. @ $16\frac{2}{3}$ ¢	24 lb. @ $16\frac{2}{3}$ ¢	96 qt. @ $12\frac{1}{4}$ ¢

1. In .06000 how many 100ths are there?

2. How many pence are there in £  $1\frac{1}{2}$ ?

3. 3s. 2d. 2f. equals how many farthings?

4. Eleven shillings is what per cent of £ 1?

5. From  $1.1\frac{1}{2}$  take  $\frac{1}{3}$ . \_\_\_\_\_

Rapidly find the product:

$18 \times .33\frac{1}{3}$	$21 \times .14\frac{2}{7}$	$81 \times .11\frac{1}{9}$	$27 \times .33\frac{1}{3}$
$48 \times .12\frac{1}{2}$	$42 \times .28\frac{4}{7}$	$48 \times .37\frac{1}{2}$	$24 \times .87\frac{1}{2}$
$72 \times .16\frac{2}{3}$	$72 \times .08\frac{1}{3}$	$48 \times .75$	$60 \times .83\frac{1}{3}$
$24 \times .66\frac{2}{3}$	$12 \times .83\frac{1}{3}$	$72 \times .50$	$56 \times .12\frac{1}{2}$
$36 \times .08\frac{1}{3}$	$56 \times .14\frac{2}{7}$	$16 \times .12\frac{1}{2}$	$54 \times .16\frac{2}{3}$

6. A fifth of a yard is what decimal part of 15 yd?
7. What is .03 of .003?
8. At  $62\frac{1}{2}$ ¢ a yard, how many yards can be bought for \$1.30?
9. At the rate of 60 mi. a day, how long will it take a ship to sail from New York to Liverpool (3000 mi.)?
10. The divisor is 600; the dividend is 2.4. Find the quotient.

Written.

1. How much will 11750 ft. of pine boards cost at \$55 per M?
2. How much will  $14\frac{1}{4}$  yd. of cloth cost, if 36.48 yd. cost \$54.72?
3. At \$25 per ton, find the cost of 14220 lb. of hay.
4. Find the difference between  $.01\frac{1}{4}$  and  $.011\frac{1}{3}$ .
5. Divide .24 by 6000. \_\_\_\_\_
6. If  $\frac{2}{5}$  of 4 tons of coal cost \$3 $\frac{1}{5}$ , how much will  $\frac{3}{4}$  of 2 tons cost?
7. If 2560 lb. of hay cost \$26.88, how much will 1 ton cost?
8. From  $6.5\frac{2}{3}$  take  $3.005\frac{1}{5}$ .
9.  $2\frac{5}{8}$  is what per cent of  $3\frac{1}{3}$ ?
10. Reduce £ 21 18s. 10d. 2f. to farthings.

## XCIV

Oral.

Rapidly add :

gal. qt.	gal. qt.	bu. qt.	bu. pk.
5 3	8 2	7 5	9 2
<u>2 1</u>	<u>5 1</u>	<u>3 2</u>	<u>8 1</u>
yd. in.	yd. in.	pk. qt.	yd. ft.
7 14	15 18	5 6	8 2
<u>8 13</u>	<u>13 12</u>	<u>9 1</u>	<u>5 1</u>

1. A woman receives \$40 interest a year. How much does she receive in 3 yr. 6 mo. ?

2. How many ounces are there in  $3\frac{1}{2}$  lb. of butter ?

3. If 4 yd. of muslin cost 48¢, how much will  $\frac{1}{3}$  yd. cost ?

4. If I bought for \$25 what I afterwards sold for \$35, what part of the cost was gained ?

5. A pole stands  $\frac{1}{3}$  in mud, and  $\frac{1}{4}$  in water, and the remainder, which measures 35 ft., is in the air. What is the length of the pole ? \_\_\_\_\_

Rapidly add :

qt. pt.	pk. qt.	bu. pk.	gal. qt.
9 1	15 5	16 2	30 2
<u>7 1</u>	<u>12 2</u>	<u>20 1</u>	<u>14 1</u>
gal. pt.	yd. ft.	yd. in.	bu. qt.
25 4	30 1	18 14	45 8
<u>18 3</u>	<u>25 2</u>	<u>13 16</u>	<u>40 4</u>

6. A can do a piece of work in 6 da. and B in 5 da. How many days will it take them if they work together ?

7. A farmer harvests 240 bu. of wheat. He sells  $8\frac{1}{3}\%$  of it. How many bushels does he sell?

8. A boy is 16 yr. old, and his father is 40 yr. old. What per cent of the father's age is the boy's?

9. Twenty-four acres is what per cent of 42 A.?

10. A man owning  $\frac{3}{8}$  of a vessel sells  $\frac{2}{3}$  of his share. What part of the vessel does he own?

**Written.**

1. Simplify  $\cdot \frac{\frac{3}{4} \text{ of } 3\frac{1}{2} \text{ of } 15}{7\frac{1}{7} \times 4\frac{1}{5} \times \frac{2}{3}}$ .

2. I bought 50 qr. of paper at \$2 a quire, and sold it at 10¢ a sheet. How much did I gain?

3. What is the difference between  $83\frac{1}{3}\%$  of 972 and  $87\frac{1}{2}\%$  of 928?

4. If \$4 $\frac{1}{2}$  will buy 1 $\frac{2}{3}$  yd. of cloth, how much will 1 $\frac{3}{4}$  yd. cost?

5. I had \$450 and spent 60% of it. How much money had I left?

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6. Simplify  $\frac{\frac{7}{8} \text{ of } \frac{16}{21}}{\frac{4}{5}}$ .

7. Find the sum of the quotients:  $.6\frac{1}{4} \div .12\frac{1}{2}$ ;  $48 \div 1.2$ ; and  $350 \div .17\frac{1}{2}$ .

8. If 2 $\frac{1}{2}$  yd. cost \$7 $\frac{1}{2}$ , how many yards will \$37 $\frac{1}{2}$  buy?

9. A wagon was sold for \$285, which was a loss of  $\frac{2}{5}$  of the cost. What was the cost?

10. A man earned \$7 $\frac{1}{2}$  a week for 6 $\frac{1}{8}$  wk. and spent  $\frac{3}{4}$  of his wages. How much did he save?



## XCV

## Oral.

Rapidly subtract :

gal.	qt.	bu.	pk.	gal.	pt.	bu.	qt.
15	3	25	2	18	6	27	18
7	2	18	1	12	2	16	12
<hr/>		<hr/>		<hr/>		<hr/>	
yd.	ft.	yd.	in.	oz.	pwt.	pwt.	gr.
52	4	19	24	24	15	45	23
45	3	11	15	16	4	18	17
<hr/>		<hr/>		<hr/>		<hr/>	

1. How much will it cost to fence a garden which is 4 rd. wide and 10 rd. long, at \$1.25 a rod?
2. How much will .75 bu. of nuts cost at 5¢ a pint?
3. What per cent of a yard is 3 ft.?
4. What per cent of the cost does a man lose who buys a saddle for \$12 and sells it for \$10?
5. The base of a triangle is 12 ft. Its perpendicular is 4 yd. What is its area?

Rapidly subtract :

£	s.	s.	d.	min.	sec.	hr.	min.
56	14	29	8	85	45	56	35
28	8	17	5	27	38	39	18
<hr/>		<hr/>		<hr/>		<hr/>	
da.	hr.	dr.	sc.	ream	qu.	score	g. gr.
62	15	51	5	57	14	83	17
27	9	26	2	29	8	28	9
<hr/>		<hr/>		<hr/>		<hr/>	

6. What is the area of a triangle in square yards, the base of which is  $4\frac{1}{4}$  yd. and altitude, 8 yd.?

7. How much will 2 qt. 1 pt. of sirup cost at \$1.20 a gallon?

8. A man sold  $\frac{3}{5}$  of his farm and had 40 A. left. How many acres were there in his farm?

9. I bought a house for \$4000, and sold it for 80 % of the cost. For how much did I sell it?

10. Find the difference between  $\$ \frac{7}{8}$  and \$.75.

**Written.**

1. If  $2\frac{1}{4}$  lb. of butter cost 63¢, how much will  $3\frac{1}{2}$  lb. cost?

2. A boy lost  $\frac{1}{3}$  of his kite string and gave away  $\frac{1}{6}$  of the remainder. He then had 400 ft. How long was the string at first?

3. A bought  $\frac{3}{8}$  of a factory and sold  $\frac{1}{4}$  of his share to B for \$2600. At this rate how much was the entire factory worth?

4. What is the area of a triangle the base of which is 45.6 ft. and the altitude, 38.2 ft.?

5. A rug 9 ft. by 12 ft. is placed on a floor 18 ft. by 20 ft. What is the area of the uncovered part of the floor?

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6. What is the cost of sodding a lawn  $27\frac{1}{2}$  yd. long and  $19\frac{1}{2}$  yd. wide at  $7\frac{1}{2}$ ¢ a square yard?

7. How many feet of molding,  $2\frac{1}{4}$  in. wide, are needed to make a frame for a picture 1 ft. 9 in. long and 18 in. wide?

8. The sides of a rectangular court measure 35 ft. 9 in. and 84 ft. 8 in. What is the length of the railing surrounding the court?

9. At \$1.25 a yard, how much will it cost to carpet a room 24 ft. by 18 ft. with carpet a yard wide?

10. How much will it cost to dig a cellar 36 ft. long, 20 ft. wide, and 8 ft. deep, at 24¢ a cubic yard?

### XCVI

#### Oral.

Rapidly multiply :

bu.	qt.	bu.	pk.	gal.	qt.	pk.	qt.
7	6	6	1	8	2	4	1
	4		4		6		3
<hr/>		<hr/>		<hr/>		<hr/>	
gal.	pt.	yd.	ft.	yd.	in.	ft.	in.
9	4	5	1	9	6	8	3
	4		3		8		4
<hr/>		<hr/>		<hr/>		<hr/>	

1. A man can cut a cord of wood in  $\frac{1}{3}$  da. How much can he cut in 1 da.?

2. A mason can build a wall in  $2\frac{1}{3}$  da. What part of it can he build in 1 da.?

3. If A and B can mow  $\frac{1}{3}$  of a field of grass in 1 da., how long will it take them to mow the whole field?

4. If B can do a piece of work in 3 da. and C in 6 da., how much can they together do in 1 da.? How long will it take both together to do the whole work?

5. If a ream of emery paper costs \$12, how much is this per quire?

Rapidly multiply :

qt.	pt.	gal.	qt.	yd.	ft.	yd.	in.
15	1	12	3	7	2	8	4
	4		8		3		9
<hr/>		<hr/>		<hr/>		<hr/>	

gal.	pt.	bu.	pk.	bu.	qt.	bu.	pt.
16	1	14	2	16	4	12	5
	2		4		4		8

6. If a man walks  $3\frac{1}{2}$  mi. in 2 hr., how far will he walk in 1 da. of 10 hr.?

7. Edward Carpenter, who owned  $\frac{2}{5}$  of the stock of a bank, sold  $\frac{3}{8}$  of his share. What part of the whole stock did he sell, and what part of the whole stock had he left?

8. 16 is  $\frac{4}{5}$  of how many times 5?

9. A's horse cost him \$200;  $\frac{4}{5}$  of this was twice the cost of his sleigh, and the sleigh cost 4 times as much as his harness. How much did each cost?

10. If I pay \$1.60 for a bushel of blackberries, what is the price per quart?

#### Written.

1. Mr. Anderson bought at different times  $20\frac{3}{4}$  A. of land,  $50\frac{1}{4}$  A., and  $17\frac{1}{2}$  A. How many acres did he buy in all?

2. In 1900 New York State had a population of 7268894. In 1910 the population was 9113279. Find the per cent of increase.

3. The State of Washington in 1900 had a population of 518103, and in 1910, 1141190. What was the per cent of increase?

4. There are 1780 pupils to be examined. If each pupil receives 4 pieces of paper, how much will the paper cost at \$1.25 a ream?

5. At 3¢ a square foot, how much must be paid for 50 boards, each 18 ft. long and  $\frac{1}{2}$  ft. wide?

6. At \$3 $\frac{1}{2}$  a rod, how much will it cost to fence a field, two sides of which are each 74 rd., one side 68 rd., and the remaining side 54 rd.?

7. From a flock of 185 sheep, a man sold 74. What per cent of his flock has he left? What per cent of his flock did he sell?

8. Find the value of  $50 + (\frac{7}{8} \text{ of } \frac{9}{15})$ .

9. If  $\frac{4}{7}$  of a piece of silk is worth \$95, what is the other part worth?

10.  $\frac{34}{5}$  is  $\frac{13}{11}$  of what number?

### XCVII

Oral.

Rapidly divide:

bu. qt.	gal. qt.	bu. pk.	gal. qt.
4)16 4	6)24 12	8)54 24	7)42 7
gal. pt.	yd. ft.	yd. in.	ft. in.
3)27 18	4)64 8	6)72 18	3)15 9

1. A tree casts a shadow of 48 ft., which is  $\frac{3}{4}$  of its height. How high is the tree?

2. Add  $\frac{1}{2}$  and  $\frac{3}{4}$ , and take the sum from 5.

3. A step is 2 ft. long. What decimal part of a yard is it?

4. What part of the cost is gained by buying for \$12 and selling for \$16?

5. What decimal part of a bushel is 8 qt.? 3 qt?

Rapidly divide :

gal. qt.	yd. ft.	bu. qt.	yd. in.
2) <u>56 16</u>	3) <u>27 9</u>	7) <u>63 2</u>	4) <u>24 16</u>
bu. qt.	gal. qt.	gal. pt.	bu. pk.
9) <u>81 18</u>	5) <u>35 20</u>	8) <u>64 8</u>	6) <u>72 24</u>

6. Three fourths of a dollar is what decimal part of \$5?

7. After spending  $\frac{3}{8}$  of his money, James had \$150 left. How much money had he at first?

8. I bought a knife for 50¢ and sold it for 75¢. What part of the cost did I gain?

9. How many dozen eggs at 25¢ a dozen must be given by a farmer in exchange for 100 lb. of sugar at 5¢ a pound?

10. Which is larger, and how much larger,  $\frac{5}{7}$  or  $\frac{3}{4}$ ?

### Written.

1. A grocer sold 23 bbl. of potatoes for \$29.90, and lost 5¢ on the cost of each barrel. How much did they cost him per barrel?

2. Mr. Robinson paid \$5250 for a house, which was  $\frac{3}{7}$  of the value of all his property. What was the value of his property?

3. If  $\frac{5}{16}$  of a ship cost \$8360, how much is the whole ship worth?

4. Multiply 3.1416 by 1000, and divide the product by 10.

5. Find the quotient of 180 divided by .009.

6. If I can do a piece of work in  $\frac{7}{8}$  da., what part of it can I do in  $\frac{3}{4}$  da.?

7. A has \$484, B has twice as much, less \$86.42, and C has \$62 more than three times as much as B. How much have they all together?

8. Simplify  $\frac{2\frac{1}{4} + \overline{1\frac{1}{2} + \frac{3}{4}}}{8\frac{1}{2} - \frac{5}{6} \times \frac{3}{4}}$ .

9. A man has \$4500 in one bank, which is equal to  $\frac{3}{8}$  of the sum he has in another bank. How much has he in both banks?

10. At \$4.50 a barrel, what decimal part of a barrel of flour can be bought for \$2.50?

### XCVIII

#### Oral.

Rapidly reduce each of the following to the next lower denomination:

$\frac{5}{8}$  bu.;  $\frac{2}{3}$  ft.;  $\frac{5}{8}$  yd.;  $\frac{3}{4}$  gal.;  $\frac{5}{12}$  sq. ft.;  $\frac{5}{8}$  pt.;  $\frac{3}{4}$  qt.;  $\frac{3}{4}$  pk.;  $\frac{2}{3}$  sq. yd.;  $\frac{5}{8}$  cu. yd.;  $\frac{4}{5}$  hr.;  $\frac{3}{4}$  doz.

What is a denominate number? an abstract number? a concrete number? a compound denominate number? Give examples of each kind.

1. A man spent  $\frac{1}{2}$  of his month's wages for board,  $\frac{1}{3}$  of it for clothing, and had \$15 left. How much did he receive a month?

2. If it takes a man  $2\frac{1}{2}$  da. to do a piece of work, how much of it can he do in 1 da.?

3. If 100 bu. of wheat cost \$67.50, what is the cost of a bushel?

4. If  $\frac{3}{5}$  bbl. of apples cost \$2.13, how much will  $1\frac{1}{5}$  bbl. cost?

5. A boy lives  $10\frac{1}{2}$  rd. from his school. How far does he walk to and from school in a day to attend 2 sessions of school?

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Rapidly reduce each of the following to the next lower denomination:

.5 pk.; .25 gal.; .75 bu.;  $\frac{5}{8}$  pk.;  $\frac{3}{4}$  yd.; .16 gal.;  $.33\frac{1}{3}$  cu. yd.; .5 qt.; .8 gal.;  $\frac{3}{8}$  ft.;  $\frac{3}{4}$  yd.;  $\frac{5}{8}$  ft.

6. If Maria spends \$.75 a day, in how many days will she spend \$9?

7. A half of 14 is  $\frac{1}{6}$  of what number?  $\frac{1}{8}$  of what number?  $\frac{1}{10}$  of what number?

8. What decimal part of a peck is 7 qt.? What decimal part is 5 qt.?

9. If I have 12 yd. of ribbon, to how many persons can I give  $\frac{3}{4}$  yd. each?

10. If  $\frac{3}{4}$  of my money is \$63, what is the value of  $\frac{1}{2}$  of my money?

### Written.

1. How many cords of wood at \$5 $\frac{1}{4}$  per cord must I give for 78 $\frac{3}{4}$  bu. of wheat at \$1.20 per bushel, and 84 bu. of rye at \$1 a bushel?

2. A man sold  $\frac{1}{2}$  and  $\frac{1}{3}$  of his farm and had 26 $\frac{2}{3}$  A. left. How many acres had he at first? How many acres did he sell?

3. If  $\frac{5}{8}$  cd. of wood is worth \$3.75, how much will  $\frac{3}{4}$  cd. cost?



4. Mrs. G. C. Edgar bought of Barton & Cooper Co. the following :

May 1	12 yd. muslin	@ \$ .08
	1 doz. shirts	@ 3.50
May 7	15 yd. silk	@ 1.25
	8 handkerchiefs	@ .12 $\frac{1}{2}$
May 21	2 pairs gloves	@ 1.75
	4 sheets	@ .58

Make out a bill for these purchases, dated June 1, 1911, and receipt it.

5. A house is worth \$2800, the farm connected with it is worth twice as much, lacking \$400, and the farming tools and stock are worth  $\frac{1}{2}$  as much as the house and the farm. What is the value of all ?

6. How much will it cost to spade a triangular lot of land whose base is 180 ft. and altitude 62 ft. at 4¢ a square yard?

7. At \$14.50 per M, how much will 450 ft. of boards cost?

8. How many packages, each containing 18 cu. in., can be packed in a box 4 ft. 4 in. long, 2 ft. wide, and 1 $\frac{1}{2}$  ft. high?

9. A rectangular lot of land which has 180 "front feet" on the street, is 250 ft. deep. Would it be cheaper to buy this lot at 12¢ a square foot or at \$31 a front foot?

10. How much will it cost to cement a cellar bottom that is 22 ft. 8 in. long by 16 ft. 7 in. wide at 85¢ a square yard?

## XCIX

## Oral.

What is  $8\frac{1}{3}\%$  of 24? of 48? of 72? of 96? of 144?

What is  $16\frac{2}{3}\%$  of 18? of 36? of 24? of 30? of 42?  
of 48?

What is  $83\frac{1}{3}\%$  of 60? of 72? of 144? of 48? of 36?  
of 12? of 6?

What is  $14\frac{2}{7}\%$  of 21? of 14? of 28? of 35? of 56? of  
49? of 63? of 70?

What is  $28\frac{4}{7}\%$  of 42? of 49? of 63? of 56? of 14? of  
7? of 21? of 70? of 28? of 35?

1. I have \$48, which is  $\frac{1}{4}$  more than I had yesterday.  
How many dollars did I have yesterday?

2. What is .05 of 1.3? .02 of 1.2? .02 of .02?

3. If the dividend is .02 and the divisor is 40 what is  
the quotient?

4. Five shillings is what decimal part of a pound  
sterling?

5. In 1 rd. 2 yd. 2 ft., how many feet are there?

1 is what per cent of 20? of 12? of 7? of 8? of 9? of 6?  
of 25? of 16?

2 is what per cent of 12? of 8? of 6? of 18? of 16?  
of 24? of 32?

3 is what per cent of 12? of 24? of 9? of 18? of 27?  
of 21?

4 is what per cent of 8? of 12? of 24? of 16? of 28?  
of 36? of 20? of 18? of 32?

6. A pole stands  $\frac{1}{3}$  in mud,  $\frac{1}{4}$  in water, and 44 ft. in air.  
What is the length of the pole? (Make a diagram.)

7. Eight ninths of 27 is  $\frac{8}{9}$  of what number?
8. If .12 A. costs \$1.20, what is the price of an acre?
9. A man owned  $\frac{8}{9}$  of a farm and sold  $\frac{2}{3}$  of his share. What part did he still own?
10.  $\frac{5}{7}$  of  $\frac{1}{2}\frac{4}{5}$  of a dollar is  $\frac{1}{10}$  of the cost of a watch. How much did the watch cost?

**Written.**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Add: \$3140.67<br/>483.24<br/>6150.08<br/>700.93<br/>8216.42<br/>629.74<br/>837.27<br/>42.86<br/>203.96<br/>1964.27<br/>483.46<br/>114.23<br/><u>986.52</u></li> </ol> | <ol style="list-style-type: none"> <li>2. How many times is 6.37 contained in 272.636?</li> <li>3. Divide 7.5 by 15; .007 by 3500; 2.5 by .00025.</li> <li>4. If <math>\frac{5}{8}</math> is the minuend and <math>\frac{2}{5}</math> the remainder, what is the subtrahend?</li> <li>5. Multiply .75 by 4; 8.047 by 17; 5.728 by 100.</li> </ol> |
|--|---|
- 
6. How many rods of fence will inclose a field, the sides of which are respectively: 34.72 rd.,  $48\frac{11}{25}$  rd., 152.17 rd.,  $95\frac{3}{8}$  rd., and  $56\frac{5}{8}$  rd.?
  7. From .1 take .075; from 1.001 take .01009; from 1.1 take 1.01009.
  8. Find the cost of 22840 railroad ties at \$174.55 a thousand.
  9. How many feet are there in 35.75 rd.?
  10. Subtract  $\frac{5}{6}$  of a hundredth from  $\frac{1}{18}$  of a tenth; from  $\frac{5}{6}$  of a hundredth.

## C

## Oral.

Rapidly add :

11	12	13	12	12	15	15	16	17	18	18	19	21	22	23
10	13	12	14	15	13	13	11	11	10	19	11	13	12	12
<u>12</u>	<u>13</u>	<u>14</u>	<u>12</u>	<u>14</u>	<u>14</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>

1. What is the sum of  $.2\frac{2}{3}$  and  $\frac{1}{4}$ ?
2. A man earned  $3\frac{1}{2}s.$  and spent  $20d.$  How much had he left?
3. How much will 10 lb. of sugar cost at  $\frac{4}{5}$  of a dime a pound?
4. If  $\frac{1}{2}$  of a number increased by  $\frac{1}{3}$  of the same number equals 75, what is the number?
5.  $\frac{1}{2}$  is what per cent of  $\frac{5}{8}$ ?

Rapidly add :

21	25	26	28	29	30	31	32	33	34	35	36	29	64	54
3	4	5	7	8	9	3	4	6	7	8	7	7	4	8
<u>24</u>	<u>25</u>	<u>26</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>34</u>	<u>36</u>	<u>38</u>	<u>39</u>	<u>30</u>	<u>20</u>	<u>12</u>

6. If a man spends  $\$3\frac{1}{2}$  a day, how long will it take him to spend  $\$3\frac{3}{4}$ ?
7. A man has  $2\frac{1}{5}$  A. of land, which he cuts up into lots of  $.4$  of an acre each. How many lots will he have?
8.  $\frac{3}{5}$  is what per cent of  $\frac{4}{5}$ ?
9. What is  $6\frac{1}{4}\%$  of  $\$800$ ?
10. How much will 6 gal. of oil cost at 15 ¢ a quart?

## Written.

1. What is .025 of 25000?

2. In 19 lb. 11 oz. 17 pwt. and 19 gr., how many grains are there?

3.  $4\frac{1}{7}$  is .025 of what number?

4. Add  $25\frac{3}{4}$ , 81.09,  $16\frac{1}{8}$ , .875, 150.5, and  $\frac{7}{8}$ .

5. Reduce  $84.05\frac{5}{8}$  to a common fraction.

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6. How many times will  $\frac{1}{3}$  bbl. of  $31\frac{1}{2}$  gal. fill a vessel holding  $\frac{5}{8}$  gal.?

7. Reduce  $\frac{1}{3}$  to millionths.

8. .3125 equals what common fraction?

9. A man owning  $\frac{3}{5}$  of  $186\frac{3}{4}$  A. of land sold  $\frac{1}{2}$  of  $\frac{3}{4}$  of his share. How much was the remainder worth at  $\$42\frac{1}{2}$  per acre?

10. A dealer sold  $\frac{5}{12}$  of his wheat to Mr. Adams,  $\frac{1}{6}$  of it to Mr. Baker, and  $\frac{5}{8}$  of it to Mr. Charles. He had 630 bu. left. How many had he at first?

## TABLES

## DRY MEASURE

2 pints (pt.)	= 1 quart (qt.)
8 quarts	= 1 peck (pk.)
4 pecks	= 1 bushel (bu.)
64 pints	} = 1 bushel
32 quarts	

## LONG MEASURE

12 inches (in.)	= 1 foot (ft.)
3 feet	= 1 yard (yd.)
5½ yd. or 16½ ft.	= 1 rod (rd.)
320 rods	= 1 mile (mi.)
63360 inches	} = 1 mile
5280 feet	
1760 yards	

## CUBIC MEASURE

1728 cubic inches	= 1 cubic foot
27 cubic feet	= 1 cubic yard
128 cubic feet	= 1 cord

## AVOIRDUPOIS WEIGHT

16 ounces (oz.)	= 1 pound (lb.)
100 pounds	= 1 hundred-weight (cwt.)
20 hundred-weight	} = 1 ton (T.)
2000 pounds	
2240 pounds	= 1 long ton
196 pounds	= 1 barrel of flour
437½ grains	= 1 ounce
7000 grains	= 1 pound

## LIQUID MEASURE

4 gills (gi.)	= 1 pint (pt.)
2 pints	= 1 quart (qt.)
4 quarts	= 1 gallon (gal.)
32 gills	} = 1 gallon
8 pints	

## SQUARE MEASURE

144 square inches	= 1 square foot
9 square feet	= 1 square yard
30¼ square yards	} = 1 square rod
272¼ square feet	
160 square rods	= 1 acre (A.)
640 acres	= 1 square mile

## CIRCULAR MEASURE

60 seconds (")	= 1 minute (')
60 minutes	= 1 degree (°)
360 degrees	= 1 circumference

## TROY WEIGHT

24 grains	= 1 pennyweight (pwt.)
20 pwt.	} = 1 ounce (oz.)
480 grains	
12 ounces	} = 1 pound (lb.)
5760 grains	

## APOTHECARIES' WEIGHT

20 grains	= 1 scruple (sc. or ℥)
3 scruples	= 1 dram (dr. or ℥)
8 drams	= 1 ounce (oz. or ℥)
12 ounces	} = 1 pound (lb.)
5760 grains	

**UNITED STATES MONEY**

10 mills (m.) = 1 cent (¢ or ct.)

10 cents = 1 dime (d.)

10 dimes = 1 dollar (\$)

**ENGLISH MONEY**

4 farthings (f.) = 1 penny (d.)

12 pence = 1 shilling (s.)

20 shillings = 1 pound or sovereign (£)

**TIME TABLE**

60 seconds (sec.) = 1 minute (min.)

60 minutes = 1 hour (hr.)

24 hours = 1 day (da.)

7 days = 1 week (wk.)

$$\left. \begin{array}{l} 52 \text{ weeks 1 day} \\ \text{or 365 days} \end{array} \right\} = 1 \text{ common year (yr.)}$$

366 days = 1 leap year

12 months (mo.) = 1 year

**MISCELLANEOUS TABLE**

12 things = 1 dozen

12 dozen = 1 gross

24 sheets = 1 quire (qr.)

20 quires = 1 ream (rm.)

20 things = 1 score

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